RECORD OF DECISION
NORTH INDIAN BEND WASH
SUPERFUND SITE

Volume 3 of 3:
Appendix C--Response Summary

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Appendix C
RESPONSE SUMMARY

I. COMMENTS RECEIVED AT THE RI/FS PUBLIC MEETING

EPA provided a public review and comment period for the North Indian Bend Wash Remedial Investigation/Feasibility Study (RI/FS) and Proposed Plan from April 15, 1991, through June 13, 1991. On May 8, 1991, EPA held a public meeting at City Hall in Scottsdale. During the meeting, EPA summarized the findings of the RI/FS and presented EPA's preferred remedial action alternatives for the site. The basic format for the meeting was (1) presentations by EPA, (2) a question and answer period for clarifications to aid formal public comment, and (3) formal public comment. At the meeting, EPA attempted to respond to all questions raised during the question and answer period, but did not respond to formal public comments. Only four individuals commented during the portion of the meeting allotted for formal public comment. The transcript from the public meeting can be found in the Administrative Record.

The question and answer period constituted the major portion of the meeting. Questions focused on several major areas:

- Health concerns,
- Property issues,
- EPA's enforcement process, and
- Remedial alternatives.

While the specific purpose of the public review and comment period was to receive comments on the remedial action alternatives considered by EPA for NIBW, EPA believes questions in the other areas are related to community concerns regarding (1) the remedies being selected, and (2) the process for remedy implementation. Therefore, in addition to responding to the formal public comments, EPA is providing in this response summary additional discussion of the questions regarding health, property, and the enforcement process.

A. HEALTH CONCERNS

Several community members were concerned about potential health effects from past exposures to VOCs in the soil or in drinking water. At least one person asked if potential past health impacts are taken into consideration in the selection of remedies. Community members wondered how someone with past exposures, particularly at relatively high levels, might be affected by future exposures.

The Agency for Toxic Substances and Disease Registry (ATSDR), the federal agency created to address public health issues at Superfund sites, released its Health Assessment for NIBW in April 1989. ATSDR's 1989 Health Assessment did not identify

adverse health effects due to contaminants at the site. EPA is not aware of any other studies or reports that identify adverse health effects in the NIBW area due to the VOCs found at the site. However, EPA has supplied ATSDR with the RI/FS, and ATSDR met with the NIBW community to discuss health concerns on July 18, 1991. ATSDR has committed to revising its Health Assessment based on the recent information received from EPA and the community.

With the available information, EPA is not able to determine the levels of volatile organic compounds (VOCs) that may have been present in NIBW-area drinking water prior to 1981, when supply wells in the area were first tested for VOCs. Nor can EPA determine how long prior to 1981 drinking water may have been affected. Therefore, EPA cannot accurately estimate the risks to the community from potential past exposures to VOCs in drinking water.

Based on the levels of VOCs observed in soil and soil gas samples, EPA does not believe contamination in the vadose zone presents a significant risk to human health through direct soil ingestion or through inhalation of vapors released from the soil. Based on the sampling performed at the site, EPA believes it is safe for residents to continue to live in the NIBW area.

At Superfund sites, EPA is required by law to select remedies that are protective of human health and the environment. Therefore, the remedial actions for NIBW will ensure that future risks from the contaminants of concern are reduced to acceptable levels. Because EPA considers risks to be additive, any future risk would be in addition to the risk associated with potential past exposures.

B. PROPERTY ISSUES

Residents were concerned EPA might pursue them for cleanup costs simply because they own property at the site. Others were concerned that the soil on their property may have been contaminated by someone else's activities, yet the owner would be stuck with the problem if he or she ever tried to sell the property.

In July 1991, EPA released a national policy entitled "Policy Towards Owners of Residential Property at Superfund Sites" (OSWER Directive #9834.6). In general, the policy states that the agency will not hold owners of residential property liable where they have not actually contributed to the problem. Note that rather than changing the way EPA has been addressing residential property at NIBW and at Superfund sites elsewhere around the country, this written policy essentially affirms EPA's previously unwritten intent regarding its exercise of discretionary authority.

For owners of residential, commercial, and industrial properties alike, the lending community's discomfort with involvement in property at Superfund sites has become a significant issue. The lenders are concerned EPA may pursue them as potentially liable parties even though they only hold a security interest in the property (a situation in which the Superfund law specifically exempts them from liability). EPA has pursued a

limited number of lenders when EPA has believed the lenders effectively became operators rather than merely holders of security interest. In order to clarify the activities EPA considers appropriate for a lender to conduct without risk of Superfund liability, EPA proposed a Lender Liability Rule (June 24, 1991, 56 Federal Register 28798). EPA believes the proposed rule is a significant step toward resolving property issues at Superfund sites.

With respect to potential soil contamination on particular pieces of property, EPA has investigated (and in many cases is selecting additional actions for) areas which historical information suggests may have contributed to contamination at the site. EPA is not aware of information indicating other areas would be expected to have soil contamination.

C. EPA'S ENFORCEMENT PROCESS

Several questions were raised regarding the role of the parties EPA identifies as potentially liable for site cleanup costs. Community members also questioned why EPA has been negotiating for remedy implementation rather than issuing orders. One individual wondered why EPA cares how much a remedy costs if EPA has identified parties to pay for it.

Parties identified as potentially liable (known as potentially responsible parties, or PRPs) may comment on EPA's proposed remedial actions during the public comment period. For EPA's comparative analysis of alternatives, PRP comments are considered within the community acceptance criteria. At NIBW, EPA also has maintained a project committee that includes state and local agencies and several of the potentially liable parties and their consultants. The committee has coordinated and reviewed the work performed throughout the RI/FS.

Sections 104 and 122 of CERCLA express a strong preference for requiring the identified PRPs to perform the work at Superfund sites. This approach ensures that money in the Superfund will be available for sites where viable parties cannot be found. If EPA identifies PRPs but the PRPs refuse to perform the work, EPA (through the Department of Justice) can bring action in federal court to require the PRPs to perform the work or EPA can use the Superfund to implement the remedy and then sue the PRPs to replenish the Superfund.

Section 122 of CERCLA also expresses a preference for use of agreements with PRPs. Negotiating agreements for remedy implementation (called Consent Decrees) may increase the time necessary for site cleanup, but there are several advantages to Consent Decrees when compared to unilateral orders. For example, through negotiations, the PRPs can come to a clearer understanding of the work to be performed so that disagreements during implementation can be minimized. In Consent Decrees, PRPs agree to pay stipulated penalties, which EPA can assess if the parties fail to comply with the terms of the agreement. (EPA can also assess penalties under an order, but under an order EPA must go before a federal judge to collect penalties if the parties

do not agree to pay them.) In addition, after EPA and the PRPs reach agreement, the public has an opportunity to comment on the settlement. The Federal District Court considers public comments in deciding whether the agreement should go into effect. Also, because the Court approves the agreement, the mechanism is already in place should EPA or the PRPs need the Court's assistance in enforcing or interpreting this agreement.

Congress has mandated that remedies at Superfund sites be cost-effective. Therefore, whether EPA performs the work or PRPs implement the remedy, costs have to be considered when comparing remedial action alternatives. However, the Superfund law also requires remedies to be protective of human health and the environment; this is one of EPA's primary considerations when selecting a remedy.

D. OTHER COMMONLY ASKED QUESTIONS (PARAPHRASED)

1. **Why is it taking so long to clean up the site?**

RESPONSE:

EPA shares the community's disappointment that more progress has not been made at NIBW. NIBW is a complex situation because over a large area there are several different industrial activities that may have contributed to the contamination. In addition, the hydrogeologic framework of the site is complicated. But it has also taken time for EPA to learn how to implement the entire Superfund program most effectively. With contaminated ground-water supply wells now closed or subject to treatment, EPA believes it is correct to proceed carefully in order to ensure selection and implementation of permanent, protective remedies.

2. **Why is a cleanup selected for some areas while others that seem like "obvious" sources are only proposed for further study?**

RESPONSE:

In order to apply a consistent analysis, including the VLEACH model, to each of the potential source areas, certain types of field sampling data are necessary. The areas designated for further study are not necessarily any more or less contaminated than Areas 7 and 8, for which soil vapor extraction is being selected. Rather, an area that appears to be an "obvious" source is only an area for further study because not all appropriate information is currently available to determine if a cleanup is necessary. Based on data obtained from the additional required investigations, EPA will apply a consistent analysis to the areas and require soil vapor extraction in all areas where vadose zone contamination presents an unacceptable threat to ground-water quality.

3. **What type of cancers are caused by exposure to TCE?**

RESPONSE:

TCE has never been shown to cause cancer in humans. However, in laboratory experiments, TCE has caused liver tumors in mice.

4. **When will work begin in the potential source areas designated for further study?**

RESPONSE:

Under EPA's current schedule, field work to implement the work required by the ROD may begin as early as the spring of 1992.

5. **Will air sampling be required to ensure the carbon air treatment units are effective?**

RESPONSE:

Yes, air sampling will be required to demonstrate the effectiveness of the air emission control equipment.

6. **How effective is soil vapor extraction?**

RESPONSE:

While soil vapor extraction is unlikely to remove all VOCs from the vadose zone, EPA believes soil vapor extraction is capable of removing the unacceptable threat to ground-water quality posed by vadose zone contamination at NIBW.

7. **Why is activated carbon considered the appropriate air emission control technology?**

RESPONSE:

Vapor-phase carbon adsorption is well-proven as a cost-effective means of reducing VOC air emissions.

8. **Why are cleanup actions necessary if the immediate risk is not large?**

RESPONSE:

Current risk from ground water is very small because contaminated supply wells are either not used or employ treatment. But closing wells does not address the long-term need for ground water. Therefore, the remedies for NIBW will recover the ground-water system for future potable use. As to vadose zone contamination, the immediate risk is very small mostly because chances of significant exposure are very small. However, if left unaddressed, VOCs in the vadose zone could continue to contaminate underlying ground water for many years.

E. FORMAL PUBLIC COMMENTS

Pamela Swift

1. **There is a whole bunch of pollution which you guys have missed. (Ms. Swift referred specifically to an old county well she believed was known to have been contaminated.)**

RESPONSE:

EPA has studied all the areas at NIBW which available information suggests may have contributed to the problem. EPA and the State continue to analyze monitoring data so that we can identify the current bounds of ground-water contamination. For the vadose zone, EPA is requiring further work to ensure that all areas presenting an unacceptable threat to ground water are identified and cleaned up.

EPA welcomes any other information about site conditions. The City of Scottsdale has searched unsuccessfully for records of the "county well" referred to at the public meeting by Ms. Swift.

2. **Do you guys know Motorola is still polluting?**

RESPONSE:

EPA does not have information indicating Motorola or other parties are still contributing to the vadose zone and ground-water contamination at NIBW. EPA is extremely interested in receiving this type of information if it exists.

3. **I want independent health surveys.**

RESPONSE:

EPA has referred health concerns to ATSDR. ATSDR has committed to revising its Health Assessment for NIBW. If ATSDR's revised Health Assessment indicates further evaluation of health conditions at NIBW is warranted, ATSDR will recommend appropriate followup studies. Under CERCLA, ATSDR is the agency that would perform or fund the followup actions.

Chuck Graf

Mr. Graf presented oral comments on behalf of the Arizona Department of Environmental Quality. EPA's responses to ADEQ's comments, which were submitted in more detail in writing, are provided in Section II of this response summary.

Dave Matuso

1. **...according to your own documentation, there has been a standard set for TCE, and that standard is 0.24 micrograms per cubic meter...the expected emissions are 0.84 micrograms per cubic meter, approximately three times the limit...Why are these limits set if you're not going to follow it yourselves?**

RESPONSE:

EPA is unaware of the source of the numbers referred to by Mr. Matuso. Consistent with current permitting practices by Maricopa County, EPA will require air emission controls for VOC air emissions above three pounds per day. Air monitoring will be required to verify the effectiveness of the emission control devices.

2. **I would also like to understand, in your handouts you state that the upper alluvial plain would be--would have a greater reduction in the early years by doing pumping and remediation of that water system. Unless I don't understand, the water isn't contaminated at the bottom and moves up. It goes from the top and moves down. And you state that this will take the pollutant out of the upper unit. By your own admission, it will not then land in the middle and lower units, and yet you're not recommending that as your recommended plan. Again, I don't understand. Is it because the cost is greater? I'd like to--it doesn't seem to follow at all.**

RESPONSE:

The ROD provides a full discussion of the comparison between pumping and not pumping from the UAU. In short, however, because of its limited effectiveness, pumping from the UAU does not appear cost-effective in comparison to not pumping.

3. **The only limit that we have in here is for TCE. I'd like to understand that the limits are for the other VOCs that have been detected. Are they more deadly? Are they less deadly?**

RESPONSE:

In the ROD, EPA has selected cleanup standards for all of the contaminants identified at NIBW, including several suspected carcinogens and compounds that present other health threats.

4. **What percentage of the cleanup is actually going to be done by the responsible parties?**

RESPONSE:

At this time, EPA expects to identify PRPs who will be responsible for performing all of the work at the site. If the PRPs refuse to implement EPA's selected remedial actions, EPA has a number of enforcement options available, including performing the work and suing the PRPs to recover costs.

5. **What oversight is the EPA going to handle on top of the Motorolas and the Siemens and so forth?**

RESPONSE:

All sampling conducted at NIBW will be performed in accordance with EPA-approved plans for sampling and analysis. EPA expects the bulk of the data to be collected by the PRPs. However, in order to ensure the data are of adequate quality, EPA periodically will take and analyze its own samples, conduct audits of PRP field sampling methods, and inspect and audit labs used by the PRPs.

Julia Connally

I have been a resident and homeowner in the southern part of Scottsdale (part of the Indian Bend Wash Superfund Site) since the beginning of 1986. I did not know of the contamination until the beginning of this year when I half caught a brief news item on television and discovered a Leukemia Cluster report in the Scottsdale Library which has the same area (Indian Bend Wash) listed. I contacted a hydrologist (AZ) on the Indian Bend Wash Superfund project. She was not aware that this contamination site was also listed as one of the Leukemia Cluster study areas.

I have been plagued since sometime in 1987 with a number of yet unexplainable illnesses and/or symptoms. They include extreme fatigue, muscle weakness, joint pains resembling rheumatoid arthritis and a myriad of other symptoms. For a lack of any other reasonable explanation, I have been diagnosed as having Chronic Fatigue and Immune Dysfunction Syndrome. I also have acquired an autoimmune problem--my immune system won't turn off. I also have been diagnosed with a rare strain of Hashimoto's Thyroiditis. Before I continue, let me add that my doctors do not consider me a Hypochondriac. I have sincerely acquired all of this since 1987! I now suffer from Environmental Allergies and Obstructive Airway Disease. The latest discovery is liver disease caused by something outside of my liver (per liver biopsy). I became classified as technically disabled in 1988.

In 1989, I began to suspect that my sudden unexplainable ill health was environmental. My first suspicion was the more obvious areas within my home. I have taken numerous steps since then to change factors that could possibly have an effect. I replaced my heating system and my hot water system. I naturally removed all chemicals outside of my home. I tore the carpeting out of my 2,000 sq. ft. home and laid parquet floors and took additional steps as I sought to improve my residence environment. I also own a $500.00 Environmental Air System. Still my symptoms persist and I continue to fail in my health.

My former roommate lived with me for two years and also became ill or felt tired and weak all the time. This person left the area for about 6 months and recovered completely. Now back in my home, my roommate is again feeling fatigued and weak all the time. A third person also experienced the same.

My questions are:

1) How can I determine (without expense since I've used up my savings and now barely survive on social security) whether my property is indeed contaminated?

RESPONSE:

Based on available ground-water data, it is likely that your property overlies contaminated ground water. However, based on available information, we have no reason to suspect that activities would have occurred which would have contaminated the soil in the immediate vicinity of your property.

2) Is there something we can get to put in the ground that is safe and will eradicate the contamination?

RESPONSE:

EPA is selecting what we believe are the appropriate remedial actions for NIBW. These actions include using soil vapor extraction and ground-water extraction wells to remove contaminants from the subsurface. EPA considered bioremediation, which includes injection of nutrients and oxygen to enhance microbial degradation. However, based on available information, EPA has determined other technologies are more appropriate for NIBW.

3) Why aren't the agencies studying the contamination and the leukemia cluster studies working jointly?

RESPONSE:

EPA attempts to coordinate its activities with those of the Arizona Department of Health Services, the agency that performed the study cited in the comment. The Arizona Department of Health Services has not suggested a link between the NIBW site and an increased incidence of any adverse health effect.

4) Why hasn't more been done to inform the community? I asked 6 neighbors and friends who have lived in the Indian Bend Superfund Site for more than 10 years (10-25) about the contamination when I realized it earlier this year and none of the 6 know anything about it except one who said "heard it was nothing to worry about"!!!

RESPONSE:

Please refer to Section II.C of the ROD for community relations activities EPA has conducted in an attempt to involve and inform the community. All persons who provided their addresses at the RI/FS public meeting and all those who submitted written comments on the RI/FS report have been added to the site mailing list to ensure they receive updates about site activities.

5) Why are the Leukemia Cluster studies using death certificates for statistics instead of using community surveys and interviewing the living persons being affected?

RESPONSE:

EPA has referred this question to the Arizona Department of Health Services, the agency that performed the study. EPA also has referred specific health concerns to the Agency for Toxic Substances and Disease Registry (ATSDR), the federal health agency for Superfund sites.

6) Why aren't the health issues and concerns in the forefront of this entire project?

RESPONSE:

As at all Superfund sites, EPA's goal at NIBW is protection of human health and the environment. EPA has notified ATSDR of community health concerns at NIBW. ATSDR met with the community on July 18, 1991. ATSDR also has committed to update its Health Assessment for the entire Indian Bend Wash Superfund site.

7) What will you do for me and for people like me which may need your help to determine if their property (or water) has been affected?

RESPONSE:

EPA has conducted and/or is requiring environmental sampling at all locations EPA believes may be associated with the contamination identified at NIBW. The municipal drinking water supply systems are continually monitored to ensure water supplies meet all state and federal requirements.

Is there a report available regarding health risks/symptoms?

RESPONSE:

ATSDR's April 1989 Health Assessment for NIBW and the Endangerment Assessment (Appendix H of the NIBW RI/FS report) provide health risk/symptom related information. These documents are available at the information repositories in the Scottsdale and Tempe Public Libraries.

II. WRITTEN PUBLIC COMMENTS

EPA received written comments on the April 1991 Public Comment Draft of the North Indian Bend Wash Remedial Investigation/Feasibility Study Report and on the proposed plan from the following:

- A & C Properties, Joe Cattaneo
- Arizona Department of Environmental Quality, Donald E. Atkinson
- Arizona Department of Water Resources, C. Laurence Linser, Frank Corkhill, and Howard R. Kopp
- Law Offices of Fennemore Craig, Robert J. Kramer, Esq.
- Patrick J. Cunningham
- Gerald S. Glassman, Plainville West, Inc.
- The MARK Group, Robert F. Kaufmann, Ph.D., C.E.G.
- Errol L. Montgomery & Associates, Inc., Ronald H. DeWitt
- Salt River Project, Richard M. Hayslip and Gary G. Small
- Siemens Corporation, Michael P. Vandenbergh of Latham & Watkins
- SmithKline Beecham, Thomas W. Beggs, P.E.
- William C. Van Norman, Jr.
- Bettina Z. Velgos

Their comments, followed by EPA's responses, are included herein. The comments have been input verbatim without corrections to style, apparent typographical errors, or word choice.

COMMENTS FROM A & C PROPERTIES

Pursuant to the most recent newspaper article in the Arizona Republic, a copy of which is attached, and the request for comments from interested parties, please be advised that our company is the owner of a shopping center in the subject Superfund site area. As you are aware, in other parts of the country when Superfund sites have been designated, and appropriate companies identified who were the pollutants, such as in the case of the Scottsdale Superfund site, Motorola Inc., Siemens Corp., SmithKline Beacham Corp., and Salt River Project, who ultimately enter into a consent decree with the EPA, and then turnaround and begin collection efforts on a second and third party basis, is inappropriate. This particular circumstance was recently chronicled in a Wall Street Journal article, where the consent decree companies have basically held every other business in the Superfund designated site hostage by virtue of bringing suit for this second and multi-tiered liability. The article chronicled such ridiculous claims as barber shops and other retail stores which might have some type of cleaning solvents in their possession as having been a contributor to the potential environmental problem.

In this case the small businessman has no option to potentially settle the claim, since the litigation cost would be outrageous and extravagant, and virtually bankrupted most of these businesses. Even if the business man was successful in defending his case, these legal fees would not be subject to contract law dispute and reimbursable by the losing party. Therefore, the businessman would be in an unrecoverable position relative to the defense legal cost. This is obviously an untenable situation and represents nothing less than a hostage mentality by the companies who agree to the consent decree.

This also sends a morally wrong signal to the polluting companies. In this manner, the polluters are able to recover all the funds they agreed to pay the EPA as part of the consent decree, and on top of it, recover all of their legal fees in the form of this extortion.

Remember, that these were the companies that originally caused the problem and were the perpetrators of the problem. Therefore, it is imperative that as part of the consent decree, if these companies have clearly been identified, than they should be the ones that in fact pay the clean-up costs, and should not be able to pursue on a second and multi-tiered basis other businesses in the Superfund designated site.

RESPONSE:

Although this comment is outside the scope of the public participation requirements of Section 117 of CERCLA, EPA is responding to the comment because it was received during the public comment period.

The commenter questions the appropriateness of CERCLA provisions that allow private parties to seek contribution from other private parties who are liable for response actions at a site. As this is the statutory scheme mandated by Congress, EPA does not modify these statutory rights by terms of a consent decree.

However, CERCLA provides three defenses to liability, which may, under the appropriate circumstances, dissuade those persons responsible for the contamination from seeking recovery against those persons who may have a defense. The defense of most significant interest to the commenter is identified in Section 107 (b) (3). A current landowner who did not contribute to the contamination at the site may be within the scope of this category, provided the landowner meets the requirements of this section.

COMMENTS FROM ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

VADOSE ZONE

There are still potential contaminant source areas that have not been fully characterized. EPA investigated more than a dozen sites to determine if soil contamination is present - and if present, to determine whether the site is a potential source of groundwater contamination. The Proposed Plan specifies soil vapor extraction (SVE) as the preferred remedial alternative at two (2) of these sites, while five (5) sites are recommended for no further action. Six (6) sites, however, still require additional characterization.

Investigation of these six sites is provided for in EPA's preferred final remedy.

ADEQ supports the use of soil vapor extraction at the two sites (Areas 7 and 8) and encourages EPA to aggressively pursue the necessary investigations at the remaining six sites and initiate timely cleanup. At two of the six requiring further investigation, shallow soil gas sampling is proposed. If the presently available shallow soil gas an area poses a threat to groundwater quality, it is unclear how additional shallow soil gas data will assist the proposed investigations. The soil vapor monitor wells recommended in the document should yield much better soil vapor data for various depths in the vadose zone. These data can then be used to perform the analysis which will indicate whether or not the area may be a threat to groundwater quality.

In summary, although the SVE proposed at Areas 7 and 8 should remove these potential threats to groundwater quality in the MAU, no action other than further investigation is proposed by EPA at the six remaining areas. However, for at least one of these areas, Area 12, there is enough indication of a significant threat to groundwater that the soils investigation should be initiated immediately.

RESPONSE:

Additional data gathered from Area 5A via shallow gas sampling will be useful to most effectively site the required soil vapor monitoring well in the area of highest VOC concentrations.

For each of the six areas where EPA has determined additional data are necessary to determine the extent of the threat to ground water posed by VOCs in the vadose zone, EPA has selected not only the necessary additional characterization activities, but also soil vapor extraction for those areas where the ground-water threat is determined to be unacceptable.

RESPONSE (Continued):

Since the Endangerment Assessment indicates the soils at Area 12 do not appear to pose a significant potential health risk from direct exposure, remedial action in Area 12 will commence as soon as soil vapor monitoring is sufficient to determine the extent of the threat to ground water and allow for the design of the remedial action, if necessary.

UPPER ALLUVIAL UNIT (UAU) GROUNDWATER

ADEQ has repeatedly expressed to EPA a preference that as much contamination be removed from the groundwater as possible. Analysis for the RI/FS Report and new NIBW data indicate that EPA's proposal for monitoring of the UAU instead of active extraction is not an adequate remedy and does not meet the requirements of the National Contingency Plan (NCP). ADEQ is concerned because of the potential for degradation of areas of the aquifers that currently are not contaminated. ADEQ prefers active remedial alternatives for groundwater contamination, especially those alternatives which remove highly contaminated groundwater from source areas or "hot spots." ADEQ again recommends EPA implement such measures at the earliest opportunity.

Consistent with this preference, ADEQ has reservations about relying on the combination of the Scottsdale Operable Unit and the selected monitoring alternative to capture and prevent further migration of contaminated groundwater in the Upper Alluvial Unit (UAU). ADEQ has statutory responsibility preserve and to protect aquifer groundwater quality for "all present and reasonably foreseeable future uses" (ARS §49-221A). Based on interpretation of modeling results and recent groundwater data, the Scottsdale Operable Unit, while it would adequately treat contaminated groundwater for use in the public drinking water system, may have limited effectiveness in capturing the contaminant plume in the Middle Alluvial Unit (MAU) and Lower Alluvial Unit (LAU) and preventing further migration of contamination into clean areas. ADEQ strongly recommends that provisions of the Consent Decree be invoked to protect water quality in the MAU and LAU.

EPA's selection of the preferred remedial alternative for the UAU groundwater appears to be based on the following:

1. The assumption that UAU contamination will migrate to the MAU and be remediated by the Scottsdale OU;

2. Modeling results (CH2M HILL and ADWR) which indicate dewatering of portions of the UAU as a result of the proposed extraction alternatives;

3. Estimated mass of contaminants removed from the UAU by the proposed extraction alternatives; and

4. Cost analysis.

1. UAU contamination to be remediated by the Scottsdale OU

Since the drafting of this RI/FS Report, a number of new monitor wells have been installed. These new wells have changed the interpretation of the groundwater system within NIBW. Of particular importance is the extreme change in Middle Alluvial Unit (MAU) groundwater flow direction in the northern portion of NIBW. It appears at this time that MAU groundwater flows to the south-southwest in the northern half of NIBW; it does not appear to flow to the north as originally believed. ADWR has suggested that water levels in the MAU need to be normalized to get a true approximation of groundwater flow to the north. However, further delineation of MAU contamination has occurred as a result of the new monitor wells and the contaminant distribution also supports groundwater flow to the south. Although these data have only recently been acquired, the information cannot be ignored in evaluating remedial alternatives for the UAU groundwater.

EPA's justification for selecting a monitoring alternative for the UAU relies on natural leakage of UAU contamination into the MAU and remediation by the Scottsdale OU. Based on the new data and the interpretation of MAU groundwater flow directions beneath the area of UAU groundwater contamination, the possibility that OU will capture the UAU contamination becomes even more speculative than previously believed.

RESPONSE:

EPA has considered the data available from the wells most recently drilled at NIBW. The available data do not alter EPA's belief that significant leakage of VOCs from the UAU into the MAU and/or LAU occurs at NIBW.

Recent data suggest contaminant migration from the UAU to the MAU and/or LAU may be significant in areas other than those identified in the RI/FS. However, it still appears UAU contamination generally overlies areas of the MAU and/or LAU that are also already contaminated. (We acknowledge that in some limited areas, the UAU and LAU are contaminated, and the intervening MAU is not.) Therefore, EPA does not believe that allowing continued leakage and conduit-aided migration will lead to significant spread of contamination into currently uncontaminated zones of the UAU, MAU, or LAU. If the additional monitoring required by EPA's preferred alternative indicates that uncontaminated areas of the UAU, MAU, or LAU are becoming contaminated due to migration of contamination from the UAU, EPA will reassess the appropriateness of a UAU ground-water extraction alternative.

RESPONSE (Continued):

EPA acknowledges the original configuration of the Scottsdale Operable Unit remedy may not be adequate to achieve complete capture in the MAU and LAU. However, the proposed Consent Decree for the OU requires the Participating Group to "establish a zone of capture encompassing the entire Zone of Ground-Water Contamination both laterally and vertically within the MAU and LAU." Therefore, as necessary, EPA, working with ADEQ and ADWR, will require additional measures to ensure MAU/LAU remedial actions are effective in capturing contaminants migrating from the UAU.

2. Dewatering of portions of the UAU as a result of pumping

ADWR's model simulation of the proposed extraction alternatives indicates that dewatering of portions of the UAU containing extraction wells will occur under all alternatives. This is to be expected for Alternative 3 which utilizes a series of wells located just east of the UAU dewatered line. In this area, the UAU saturated thickness is at a minimum and would not be expected to sustain pumping for a long period of time. Alternative 4 utilizes wells placed along Indian Bend Wash. Again, most of the wells are located in areas of limited saturated thickness. Alternative 5 utilizes two extraction wells located in the center of the plume where groundwater contains the highest levels of VOCs. These wells are also located within an area of thicker saturated UAU.

As stated, modeling indicates dewatering of portions of the UAU when the extraction alternatives are simulated. However, adding recharge (the only end-use which survived the screening process) in CH2M HILL's modeling prevented dewatering within the 10 year simulation period in all three alternatives. With recharge as an end-use, the ADWR model still simulated dewatering for Alternative 3. Alternative 4 with recharge did not result in dewatering. ADWR did not model Alternative 5 with recharge.

RESPONSE:

Analyses to date support the position that recharge of treated water would improve the implementability and effectiveness of a ground-water extraction system for the UAU. Nevertheless, the variable, thin saturated thickness of the UAU remains as a serious challenge to successful remedial action ground-water pumping from the UAU.

RESPONSE (Continued):

Note that pages J-60 and J-69 of the RI/FS do not indicate that all dewatering will be prevented, but rather, as depicted on Figures J-29 - J-31, "No overall, additional dewatering of the UAU is projected after 10 years when recharge as an end use is included." (emphasis added).

Also note that neither modeling analysis included in the RI/FS can simulate with great accuracy the impact of the decreasing availability of treated water for recharge due to diminishing pump production caused by water level declines.

EPA disagrees with the characterization that most of the wells for Alternative 4 are located in areas of limited saturated thickness. The locations for most of the wells in Alternative 4 benefit from an alignment of greater saturated thickness, which appeared to coincide with the Indian Bend Wash.

3. Estimated mass of contaminants removed by extraction alternatives

ADWR's modeling results indicate that only 80 gallons of TCE (approximately 26% of the TCE in the UAU) will be removed by the most efficient extraction alternative (Alternative 3 with recharge). However, 80 gallons of TCE is enough to raise the concentration in approximately 67,500 acre-feet of water to the MCL of 5 µg/l. In addition, this 80 gallons represents the volume of TCE estimated to be present in the groundwater only. The volume does not include the mass of TCE sorbed to the solid particles in the aquifer nor does it include the volume of other VOCs present in the UAU in either the liquid or solid phases. Therefore, this is believed to be a serious underestimation of the amount of contaminants present in the UAU.

RESPONSE:

EPA recognizes that 80 gallons is a significant volume of TCE, particularly in light of the large volume of water that could become contaminated by this volume of solvent. However, as pointed out in ADEQ's comment, as a measure of the relative effectiveness of a UAU ground-water extraction system, ADWR's estimate still represents only approximately 26 percent of the TCE in UAU ground water and less than 2 percent of the TCE in the entire ground-water system.

RESPONSE (Continued):

EPA acknowledges that certain simplifying assumptions are involved in ADWR's TCE mass estimate for the UAU. Some amount of sorbed or liquid-phase TCE may be present in the UAU, MAU, and/or LAU. Assumptions made by ADWR may have resulted in an underestimate for the mass of TCE present in the UAU; however, ADWR made the same assumptions in estimating the TCE mass for the MAU and LAU. Therefore, if compensation for potentially sorbed or liquid phase TCE is appropriate for the UAU, compensation also generally would be appropriate for the MAU and LAU. As a result, the general relationship of total TCE mass in the UAU to total TCE mass in the entire ground-water system would not be expected to change substantially.

The data available for NIBW more readily support a mass estimate for TCE than for any other VOCs found at the site. ADWR estimated the mass of only TCE rather than the mass of all VOCs because monitoring data indicate TCE is the most prevalent ground-water contaminant, both in terms of frequency of detection and concentrations observed. Therefore, for the purposes of the comparative analysis of alternatives, the use of TCE as the indicator chemical is appropriate. Nonetheless, EPA acknowledges that all of the VOCs found at NIBW (in the vadose zone, MAU, and LAU, as well as in the UAU) contribute to the threat to human health and the environment. The additional monitoring included in EPA's preferred ground-water alternative will allow us to monitor all VOCs of concern.

In addition, note that performance standards for ground water for NIBW remedial actions are based on VOC concentrations as indicated by water samples. We do not believe the potential sorbed VOC mass represents a greater human health risk than that represented by observed ground water VOC concentrations.

4. Cost analysis

Justification for EPA's selection of Alternative 2 as the preferred UAU remedial alternative has also been based on a cost analysis for implementation of the remedial alternatives. A comparison of the costs is presented in Table 10-5. EPA's preferred alternative (Alternative 2) includes the installation of 30 new monitor wells (20 UAU wells and 10 MAU wells). Total present worth cost of Alternative 2 is estimated at $20,570,000. Alternative 48 is estimated to cost $25,102,000 and includes all Alternative 2 requirements plus UAU extraction, treatment, and recharge. The incremental cost for active remediation vs. monitoring is $4,532,000 over the 30 year analysis period. It is believed that monitoring requirements could be reduced if extraction were implemented for the UAU groundwater with the savings being better spent on active remediation. It is also emphasized that continued monitoring under Alternative 2 has the

potential for determining that pumping and treating of the UAU groundwater may be required in the future.

RESPONSE:

EPA believes the degree of additional monitoring included in Alternative 2 (and Alternative 48) is required to ensure adequate protection of human health and the environment whether or not there is ground-water extraction from the UAU. In fact, EPA believes the estimates provided for additional wells may represent only the minimally acceptable level of monitoring. Additional wells in the UAU and/or MAU may be necessary based upon information obtained from the initial wells. A reduction in monitoring would result in less overall protection.

The costs of Alternative 2 include in excess of $12 million dollars in "active remediation" costs associated with the Scottsdale Operable Unit remedy. EPA agrees that continued monitoring of the ground water may indicate pumping and treating of UAU ground water is necessary. If this occurs, EPA will pursue the implementation of additional actions as quickly as possible.

CONSISTENCY WITH NATIONAL CONTINGENCY PLAN (NCP)

ADEQ contends that the preferred alternative for final remedy presented for public comment does not fully meet the requirements of 40 CFR 300.430.

The NCP, specifically, Section 300.430(a) (ii) (c) states:

> Site specific data needs, the evaluation of alternatives and the documentation of the selected remedy should reflect the scope and complexity of the site problems being addressed.

Further, section 300.430(a). Scoping, states:

> Scope and detail of the analysis is appropriate to the complexity of site problems being addressed.

In addition, section 300.340(iii) (a) requires "Overall protection of human health and the environment." ADEQ contends that non-treatment of the UAU is non-protective of human health and the environment on the short term and the complexity of the hydrogeologic regime is such that ADEQ questions EPA's reliance on contaminant migration from the UAU to the MAU and LAU for treatment.

The location of the treatment system is such that contamination in the MAU and LAU may move to presently uncontaminated production wells before the treatment is completed.

The NCP further requires at Section 300.340(b), "Compliance with ARARs". Certain State ARARs have been ignored while others are not fully addressed.

RESPONSE:

EPA has determined that the selected remedial action for the UAU meets the requirements of the NCP, and in particular, the requirements of 40 CFR 300.430.

EPA's preferred UAU alternative provides overall protection of human health and the environment. EPA acknowledges additional extraction locations, or other measures, may be required to ensure full capture of VOCs in the MAU and LAU. However, because contaminated areas of the UAU generally overlie contaminated areas of the MAU and/or LAU, EPA does not believe continued migration of VOCs from the UAU will necessitate additional MAU or LAU extraction wells. EPA will continue to work with ADEQ and ADWR to ensure that the monitoring gives sufficient warning to protect uncontaminated ground-water production wells in the vicinity of NIBW. The proposed Consent Decree for the Scottsdale OU remedy should provide the mechanism for requiring additional MAU/LAU remedial actions.

The NIBW hydrogeologic framework is complex. Even after 10 years of study, we continue to learn about site characteristics. While EPA acknowledges uncertainties regarding the relationship of the UAU, MAU, and LAU, the data do not indicate ground-water extraction from the UAU is warranted at this time. However, EPA also believes extensive additional monitoring is necessary to determine if a remedy without pumping from the UAU is protective. If data indicate (1) the mass of VOCs within the UAU is migrating to uncontaminated areas of the UAU, MAU, or LAU, or (2) the mass of VOCs in the UAU is not decreasing significantly and continuously, EPA will reassess the appropriateness of UAU ground-water extraction alternatives.

Based on available information, EPA does not believe anyone at NIBW is being exposed to ground water (from either the UAU, MAU, or LAU) with levels of VOCs above drinking water standards. In addition, water treated at the Scottsdale OU Treatment Plant will meet drinking water standards. Therefore, in both the short- and long-term, continued monitoring of public drinking water supplies will ensure no one at the site is exposed to unacceptable levels of VOCs.

RESPONSE (Continued):

EPA conducted its ARARs analysis for NIBW in full compliance with CERCLA and the NCP. The Public Comment Draft RI/FS identified potential ARARs, including potential state ARARs, for NIBW. EPA has considered all comments submitted by ADEQ concerning potential ARARs. The final ARARs identified in Appendix A of the Record of Decision include additional ARARs and other criteria based on ADEQ's comments on the draft RI/FS. EPA agrees with ADEQ that the remedial actions in this ROD must meet all ARARs.

Specific Comments

The following comments are referenced to specific sections of the RI/FS Report.

VOLUME 1

(1.) Page 1-24, Area 12

At the Motorola facility, domestic and industrial wastewater were reportedly released to "dry" wells. Even with the present decline in water levels in this area, a 200 foot deep well could not be a "dry" well. Based on the estimated depth to water of 100 to 120 feet (Figure 3-40) and depth to the top of the Middle Alluvial Unit (MAU) in Figure 3-10, a 200 foot deep well could have resulted in disposals/injection directly into groundwater in the UAU and/or the MAU.

RESPONSE:

"Dry" well in this case is the term used in the original reference (Hargis & Montgomery, 1983). For the type of construction and intended purposes of the subject wells, the local common term "dry" well is applicable. ADEQ is correct that a "dry" well to a depth of 200 feet would not be entirely dry. At abandonment in 1987, the water level in the dry well was approximately 165 feet below ground surface.

(2.) Page 2-7, Table 2-2

As of August 1989, the highest soil gas concentrations detected were at the Motorola facility (Area 12). Based on this information, it is unclear why no soil vapor monitor wells have been installed at this facility.

RESPONSE:

The ROD requires five soil vapor monitoring wells at Area 12. Previous investigations at Area 12 have been limited, to some extent, by the need to balance the objectives of the overall site characterization with the need to develop enforcement information, given limited available resources.

(3.) Page 2-9, Table 2-3

The soil cleanup levels presented in this table are no longer referenced by ADEQ for soil remediations. ADEQ has developed Draft Health-Based Guidance Levels (HBGLs) for soils based on average daily ingestion of soil during a 70 year lifetime. The HBGLs were released for review and comment in September 1990. Once finalized, the HBGLs will supersede the levels listed in this table.

RESPONSE:

Vadose zone remedial actions at NIBW shall comply with HBGLs.

(4.) Page 2-9, last paragraph

This statement indicates that risk due to potential exposure to underlying groundwater may exist beneath source areas. It is assumed that a threat to, not exposure to, the underlying groundwater quality is intended.

RESPONSE:

The intent of the statement is that potential contamination of ground water could adversely affect ground-water supplies.

(5.) Page 2-39, third paragraph

Additional shallow soil gas sampling is recommended for Area 5A near Sample Points 102 and 104 because one soil gas sample detected 1,1-DCE at 34 µg/l. The usefulness of this shallow data to further define one anomalous point appears to be questionable. At other areas, shallow soil gas is not considered conclusive data to indicate a threat to groundwater quality, why would it be recommended here? Installation of a soil vapor monitor well is recommended in this area. Soil vapor monitor well data would be much more useful in determining whether or not Area 5A is a threat to groundwater quality.

RESPONSE:

The shallow soil gas results will be useful to most effectively site the required soil vapor monitoring well in the area of highest VOC contamination.

(6.) Page 2-43, second paragraph

The first sentence references an earlier statement in the previous paragraph and does not make sense. Is boring 6-208 or 6-210 being discussed?

RESPONSE:

The sentence refers to all borings where soil samples were collected. These are Borings 6-201, 6-202, 6-203, 6-204, 6-205, 6-206, and 6-208.

(7.) Page 2-44, second paragraph

Confirmation of shallow soil gas concentrations of 1,1-DCE appears pointless. Varying concentrations detected may be the result of degradation processes in addition to possible laboratory error. With data from the existing soil vapor monitor wells 6-210 and the two proposed soil vapor monitoring wells, there should be adequate information to determine whether or not the vadose zone at Area 6 continues to be a threat to groundwater quality.

RESPONSE:

Additional shallow soil gas surveys, similar to those performed to date, were not proposed on Page 2-44. The issue being raised relates to apparent inconsistencies in 1,1-DCE results at Area 6. The soil vapor monitoring wells will provide additional data to clarify VOC results.

(8.) Page 2-56, Shallow Soil Gas Investigations

No discussion is provided for the Area 8 soil gas sampling results from February 1989 presented in Figure 2-18.

RESPONSE:

Area 8 Eastern Section soil gas results for 1,1-DCE ranged from detection limits to 45.9 µg/l (8-311) with five additional samples above 10 µg/l (See Figure 18). Chloroform ranged from undetectable to 2 µg/l and 1,1,1-TCA from undetectable to 1.42 µg/l. TCE ranged from below detection limits to 40 µg/l (8-312) with seven additional sample sites registering above 10 µg/l. PCE ranged from below detection limits to 62.3 µg/l (8-312) with nine additional sites registering above 10 µg/l.

(9.) Page 2-65, second paragraph

This states that 10 soil borings were completed in Area 8. However, Figure 2-19 only shows the locations for five borings and the results for seven of the borings. Why are the rest of the data not presented?

RESPONSE:

Eight soil borings are shown on Figure 2-19. Figure 2-16 shows the locations of the remaining borings and their results. Boring 8-204 was not completed because it overlies the Mandell Shooting Supply firing range bunker, whose massive concrete structure would render drilling techniques available to the project extremely inefficient.

(10.) Page 2-73, Conclusions

How many times has soil vapor monitor well 10-201 been sampled? What is the sampling regime for the soil vapor monitor wells installed to date?

RESPONSE:

Soil vapor monitoring well 10-201 has been sampled once to date by EPA. We understand the owner of the property may have sampled the well after EPA. Sampling schedules for soil vapor monitoring wells will be determined in the remedial design phase.

(11.) Page 2-77 and 78, Conclusions

There does not appear to be much justification for proposing two soil vapor monitor wells at this relatively small site based on a TCE concentration of 181 µg/l in one shallow soil gas result and a shallow (0-5.5') soil sample concentration of 20-40 µg/kg.

RESPONSE:

As mentioned in 2-78, the bounds of contamination cannot be estimated reliably with available data. EPA believes two soil vapor monitoring wells are necessary to determine the extent of VOC contamination.

(12.) Page 3-51, third paragraph

What does the presence or absence of a fully saturated portion of the UAU have to do with the MAU being a confined or unconfined aquifer?

RESPONSE:

The MAU per se is not an aquifer. The terms "confined" or "unconfined" would strictly apply only to aquifers within the MAU. Coarse-grained vertical intervals within the MAU are interpreted to be aquifers. These intervals are each believed to be confined if the UAU is saturated. A lack of water in the UAU indicates the water table may have fallen into the shallowest of these intervals.

(13.) Page 3-94, fifth paragraph

EPA has proposed an MCL of 5 µg/l for PCE which would seem to be the appropriate standard. As stated previously (see comment Page 2-9), ADHS Action Levels are no longer used.

RESPONSE:

EPA is selecting 5 µg/l as the PCE cleanup standard for treated water and for in situ ground water at NIBW.

(14.) Page 3-100, VOCs in UAU Groundwater

The statement that the eastern limit of VOC contamination in UAU groundwater has been defined is no longer accurate. Installation of monitor well D-1UA in December 1990 has indicated that UAU groundwater contamination exists beneath Area 6. This data is not included in Figure 3-40 to indicate that the eastern limit of the contamination is still undefined in this area.

RESPONSE:

Our inspection of the latest available data indicates that UAU contamination is present but not bounded with monitoring well data in the vicinity of Area 6.

(15.) page 3-107, first paragraph

As stated, "cascading water may be indicative of UAU water entering the borehole of these wells above a low permeability zone and flowing down into zones with lower hydraulic head". Because the hydraulic heads in the MAU and LAU are 60 to 84 feet lower than in UAU, this cascading water will likely be carried down the well hole and enter the MAU and LAU.

While it is agreed that the results of sampling cascading water are not as useful as monitoring well samples, the negative impact these cascading wells can have on the groundwater quality of the lower aquifers is nonetheless evident.

RESPONSE:

We believe VOCs migrating to the MAU and/or LAU from the UAU will be captured by the Scottsdale OU remedy. Therefore, EPA also notes there is a benefit to the UAU due to cascading wells.

(16.) Figure 3-40, Water Levels and TCE Concentrations in UAU Monitoring Wells, February 1989

No TCE concentration was provided for M-4UA on this map (or Figure J-10). The last TCE concentration reported for this well in Table E-1A was 135 µg/l in November 1988. If this concentration and the last reported concentration for ST-3 (75 µg/l) are contoured, the configuration of the contaminant distribution changes. Recontouring of the TCE concentration honoring these values appears to support the conclusion that TCE concentrations may correspond to support the conclusion that TCE concentrations may correspond to UAU-MAU contact topography as stated on Page 3-103.

RESPONSE:

We do not agree with the proposed extrapolation for the purposes of the document. The concentration maps were intended to show data values for one period of time. The suggested interpretation may have validity.

(17.) Page 3-103, first paragraph

Although a general decline in TCE concentrations has occurred in monitor wells at the Motorola facility, it appears that the highest concentrations have moved to the west in the direction of groundwater flow. Long term changes in concentrations in UAU monitor wells downgradient from Motorola cannot be determined based on the short period of record for most of the wells. However, it appears from Figure 3-41 that concentrations in M-2UA and B-J wells may be increasing. This increase may result from higher contaminant concentrations moving towards these wells.

RESPONSE:

Such a process is one of several possible explanations for the noted observations.

(18.) Page 3-104, third paragraph

There seems to be some problem with this explanation for differences in PCE to TCE ratios. PCE would be expected to degrade to TCE, therefore rising concentrations of PCE relative to TCE concentrations cannot be explained by degradation alone.

RESPONSE:

The potential causes of the noted phenomenon are several and complex.

(19.) Page 3-104, last paragraph

It would not be surprising to detect 1,1-DCE and 1,1,1-TCA in groundwater samples from monitor wells near a confirmed 1,1,1-TCA release to soils. Based on past experience in the Phoenix Metropolitan area, it is common to see 1,1-DCE in groundwater as a degradation product of 1,1,1-TCA, and generally, it occurs in higher concentrations than 1,1,1-TCA.

RESPONSE:

ADEQ's experience under similar circumstances is appreciated in evaluating potential causes of noted phenomena. The selected remedial actions are required to address all VOCs.

(20.) Figure 5-2, Groundwater Technology and Process Option Screening

SRP holds rights to withdraw groundwater within the NIBW. Why was SRP excluded as a potential end use in this evaluation?

RESPONSE:

All water users and purveyors were surveyed in 1986 and 1989 to determine their level of interest in using treated ground water, and their capacity. At the time of our inquiries, SRP did not express significant interest in receiving the treated water. The City of Scottsdale was the "selected" end user; however, the Consent Decree negotiations for the Scottsdale OU indicate the significant complications brought about by specifying a water supply end user as part of a selected remedial action.

(21.) Page 5-27, Table 5-2

An MCL now exists for PCE and should have been included on this table. In addition, a number of other VOCs (1,1,1-TCA, toluene, benzene, carbon tetrachloride, etc.) have been detected in ground-water samples from monitor wells in this area. These contaminants should also be included.

RESPONSE:

Table 5-2 of the RI/FS represents the standards originally identified for the Scottsdale OU. The MCL for PCE is in the Record of Decision (ROD) as the selected PCE cleanup standard for treated water and in situ ground water at NIBW.

(22.) Page 7-2, second paragraph

Other alternatives besides those analyzed in the RI/FS exist to contain UAU contamination before it reaches the MAU and/or LAU groundwater. Because large capacity water supply wells are believed to enhance transport of VOCs from the UAU to the underlying units, it would seem more efficient to remove this contamination from the UAU before it is transported to the MAU and LAU. Some SRP wells with cascading UAU water have been identified as conduit wells in the RI/FS and other technical reports. These wells are located in the southern portion of the site, near the source(s) of UAU groundwater contamination. SRP has stopped pumping these wells because of the high concentrations of VOCs. Transport of contaminants by the cascading water, however, has been augmented by the cessation of pumping. Wellhead treatment would allow SRP to pump these wells for their designated uses. Although this alternative has not been fully evaluated it appears to have a number of advantages:

1. Pumping of these wells would intercept UAU groundwater contamination close to the source(s) where VOC concentrations are higher while also removing the VOCs before they could reach the MAU and LAU. For example, SRP well 22.5E,6N has an average TCE concentration greater than 300 ppb but the average concentration of the Scottsdale OU extraction wells is approximately 50 ppb. Assuming a pumping rate of 1000 gpm, this one well could remove the same amount of TCE in a year as the four OU extraction wells.

2. There would be no dewatering of the UAU because these wells pump from the MAU and LAU. Instead, only the natural groundwater flow from the UAU into these wells would be intercepted.

3. VOC removal from the MAU and LAU, the producing intervals in these wells, would occur close to the source(s) before the VOCs must travel two miles to the Scottsdale OU extraction wells. This is important because the longer VOC contamination exists in the aquifer, the more diffusion into finer grained sediments can occur. Subsequent removal of VOCs from these materials is difficult and prolongs the time required for the remedial action.

4. The cost of implementation would be minimized because the wells already exist (and SRP has already suggested their use for the purpose of contaminant extraction).

5. There would be no need to require SRP to pump a specified amount from these wells because any pumping would remove contaminants that would not be captured by any of the proposed groundwater alternatives.

6. ADWR would not be concerned with water rights or beneficial use issues because SRP already holds the rights to withdraw the water.

RESPONSE:

EPA acknowledges the potential benefits of the proposals discussed. However, the proposed alternatives are not UAU alternatives. Cascading will proceed at a constant rate under any schedule of pumping of these wells. Therefore, the proposed action changes conditions in the MAU and LAU, but not the UAU. Actions that directly address the MAU and LAU are most appropriately pursued based on supplemental study of the Scottsdale OU remedy. Voluntary actions outside of this process could be beneficial. EPA is not attempting with this ROD to limit such beneficial actions.

(23.) Page 7-2, third paragraph

Natural attenuation of groundwater contamination as a result of migration should not be termed "restoration." VOC concentrations in the UAU groundwater have been reduced beneath the Motorola facility, at least since monitoring data have been available. However, the result of this apparent "restoration" of UAU groundwater has been contamination of UAU groundwater located to the west and downgradient of Motorola in addition to contamination of groundwater in the underlying MAU and LAU.

RESPONSE:

The term "restoration" refers to the decrease in VOC concentrations to acceptable levels. It is stated on Page 7-2 that the VOCs have moved to the west and to the MAU. It appears VOC mass has migrated out of the UAU.

(24.) Page 7-3, third paragraph

Migration of presently observed UAU contamination to uncontaminated areas of the UAU is not expected to occur because it already has spread throughout the major portion of the UAU. Only the UAU upgradient (East) from Motorola does not show significant concentrations of VOCs. Based on the most recent monitoring data, UAU groundwater contamination is more widespread than the RI/FS maps show. A review of groundwater quality data in Table E-1A indicates that VOC contamination has been detected in every existing UAU monitor well.

Table E-1A shows that results of analysis for TCE have not been reported for B-1UA since August 1987. When TCE is the primary contaminant of concern at this site, it is puzzling to find that analytical results are not reported. Obviously this data must be available somewhere if it was used to plot concentrations in Figure F-2. Why were these data not included in Appendix E?

RESPONSE:

The extent of UAU contamination is greater than shown in the RI/FS report, based on very recent data (see Figure 20 in ROD). Some data for B-1-UA were accidently omitted from Table E-1A. TCE is rarely detected in Well B-1UA.

(25.) Page 7-4, last paragraph

As stated previously, it is not uncommon to detect high concentrations of 1,1-DCE in groundwater as a result of degradation of 1,1,1-TCA. If degradation of the 1,1,1-TCA

is the source of the 1,1-DCE, it is not unexpected that 1,1,1-TCA is not longer commonly detected in UAU monitoring wells.

RESPONSE:

ADEQ's experience under similar circumstances is appreciated in evaluating potential causes of the noted phenomena.

(26.) Page 7-14, Evaluation of the Effectiveness of Alternatives

The UAU groundwater extraction alternatives were evaluated based on the estimated mass flux of TCE entering the MAU. However, review of groundwater quality analyses for UAU monitor wells as well as this document (see Figures J-10 through J-13 and Appendix E) indicates that other VOCs (i.e., PCE, 1,1-DCE and chloroform) are present in the UAU groundwater. Addition of these other contaminants to the TCE concentrations increases the VOC concentrations significantly. For example, the TCE concentration in E-7UA is reported at 110 µg/l but addition of PCE and 1,1-DCE increases the total VOC concentration in this well to 532 µg/l. Therefore, evaluation of the effectiveness of alternatives based solely on TCE concentrations may be adequate to evaluate areal capture of contaminants but substantially underestimates the effectiveness of the proposed extraction alternatives to remove contaminant mass from the UAU groundwater.

Additionally, a calculation of contaminant mass based on groundwater concentrations does not consider the mass of contaminants which are sorbed to the aquifer solids. Even at very low levels of organic carbon content, this mass of contaminants can be quite significant. Using an estimated f_{oc} of 0.00055 from Table K-3 to calculate the percentage of TCE mass in the liquid and solid phases of the UAU indicates that 70% of the TCE will be in the liquid phase and 30% sorbed to the solid aquifer particles. ADWR's modeling estimated that 313 gallons of TCE are present in the UAU groundwater. Therefore, an estimated 134 gallons of TCE is sorbed to the aquifer material. The sorbed TCE will be a continuing source of contamination to UAU groundwater. As stated previously, other VOCs are also present in the UAU groundwater. Because PCE has a higher K_{oc} value than TCE, performing the same calculation results in an estimate of only 45% of the PCE in the liquid phase. This indicates that PCE, although it occurs in lower concentrations than TCE in UAU groundwater, may continue to contaminate UAU groundwater for a longer period of time than the TCE.

RESPONSE:

The comment is a useful observation for further evaluation of the data; however, the ground-water extraction alternatives were developed to control movement of ground water within the target area. The target area covered TCE concentrations greater than 1 µg/l and encompasses all other VOC detections. EPA acknowledges that other VOCs contribute to the potential threat to human health and the environment. However, we believe the use of TCE as the indicator chemical in our analysis is appropriate, given the prevalence of TCE in the monitoring data. To use the sum of the VOCs as our measure of effectiveness is not appropriate because they have different toxicities and ARARs, and from a preliminary analysis it does not appear to lead to a more protective remedial action.

(27.) Page 7-16, Production Wells

Although the flow via cascading in production wells has not been quantified, potential impacts from this transport can be estimated. The presence of a conduit well (SRP 22.5E,6N) with documented cascading water from the UAU to MAU and LAU is located in the middle of the highest concentration of UAU contaminants. Overlay of the UAU contaminant distribution onto LAU contaminant distribution indicates that this may be a major source of the groundwater contamination. One of the remedial response objectives for groundwater contamination in the UAU is to reduce the migration of contaminated groundwater to the MAU and LAU. Both natural leakage across the UAU/MAU contact and transport between units through conduit wells needs to be addressed in the proposed remediation. Although it may be difficult to prevent the natural leakage of contaminants between units, providing wellhead treatment so that conduit wells could be pumped would intercept the unquantified amount of contaminants being transported by this mechanism.

ADEQ staff engineers have estimated the cost of providing wellhead treatment for SRP well 22.5E,6N based on EPA methodology presented in the "Hazardous Materials Treatment Technology" document. The cost estimate of a similar project undertaken by ADEQ and SRP in the South Mesa Water Quality Assurance Revolving Fund (State Superfund) site. Provided the means to ensure these estimates were reasonable. Capital costs are estimated at $457,000 with estimated operation and maintenance costs of $120,000 per year. The treatment system, consisting of an air stripping unit and vapor phase GAC, was sized for a pumping rate of 1,000 gpm of groundwater at contaminant levels historically reported for SRP well 22.5E,6N.

RESPONSE:

EPA acknowledges the potential benefits of the proposals discussed. However, the proposed alternatives are not UAU alternatives. Cascading will proceed at a constant rate under any schedule of pumping these wells. Therefore, the proposed action changes conditions in the MAU and LAU, but not the UAU. Actions that directly address the MAU and LAU are most appropriately pursued based on supplemental study of the Scottsdale OU remedy. Voluntary actions outside of this process could be beneficial. EPA is not attempting with this ROD to limit such beneficial actions.

(28.) Page 10-11, second paragraph

Based on EPA's previous experience in negotiating treated water end-use for the Scottsdale Operable Unit (OU), only recharge as a potential end-use of treated UAU groundwater has passed the screening process. It is believed that a mixed use for the treated water is still a viable option. In order to accommodate water users' coordination problems, a recharge end-use could be the first choice and the water user would be responsible for providing connection to the treatment system in order to tap the treated water for system uses when needed. SRP has previously commented on their water withdrawal right within the NIBW area and their interest in treated water from proposed remediations.

RESPONSE:

Recharge of the full volume extracted would be needed to maintain extraction capacity in the wells. Otherwise, long-term decline due to the remedial action will result. Therefore, mixed end use is not considered viable. Contingencies that cannot be defined at this time would most probably be added in the design phase. Also, experience with the Scottsdale OU indicates that dedicated water supply end uses may be extremely difficult to implement.

(29.) Page 10-14, Compliance with ARARs

It is stated that Alternative 2 (monitoring) likely would attain ARARs through implementation of the Scottsdale OU. But it is also stated that ADWR's modeling suggests the OU will be insufficient to contain and capture MAU and LAU groundwater above ARARs. As stated in previous comments, relying on the OU to provide remediation of the UAU to meet ARARs seems completely unrealistic based on the data available at this time.

RESPONSE:

The effectiveness of the Scottsdale OU remedy as presently designed is unknown, but its required performance is known. The proposed Consent Decree provides for enforced implementation of further action to achieve capture. Adjustment of the Scottsdale OU remedy to achieve complete capture does not appear unrealistic to EPA.

(30.) Page 10-14, Short-Term Effectiveness

Alternative 2 relies upon the existing flow of contamination from the UAU to the lower units as the means of removing contaminants. Contamination in the UAU is not expected to spread beyond the areas already impacted (however installation of new monitor wells may result in detections in areas presently believed to be free of VOC contamination). Under Alternative 2, migration of contamination to the lower units would be allowed to continue. This is anticipated to compound the problems already indicated by the modeling of the OU to remediate the MAU and LAU. The MAU is known to be extremely heterogeneous containing more silts and clays than either the UAU or LAU. The contaminants of concern at NIBW are known to be hydrophobic (have an affinity for the solid phase rather than liquid phase). Allowing continued migration of contaminants from a coarse-grained interval to a finer-grained interval where remediation will be more difficult does not make good technical sense. Greater sorption of the contaminants can be expected in finer-grained lithologies because of the higher organic carbon content in these facies. Because diffusion into the smaller pore spaces can occur, even non-sorbed (dissolved) contaminants will be harder to remove from the aquifer.

RESPONSE:

The contaminants of concern at NIBW are classified as hydrophobic; however, their solubility limits are quite high, especially compared to MCLs. Removal from finer-grained sediments will be more difficult. However, entry of the contamination into and through the MAU has already occurred. Immobile zones and sorption sites have already been occupied. Therefore, the comment does not support protection of the MAU's immobile zones or sorption sites. Also, it is not likely additional pumping from the UAU would make significant changes in these impacts.

In addition, the possibility of contaminated soil acting as a continuous source of UAU groundwater contamination has not been addressed to date by either the Remedial Investigation or the Feasibility Study. Only two source areas have been identified for soil remediation (Areas 7 and 8). Both of these sources are located in the area where the UAU is believed to be dewatered and therefore are most likely responsible for

MAU groundwater contamination. No remediation of soil contamination has been proposed within the area of UAU groundwater contamination. As long as the potential for VOC contamination in the vadose zone is unknown, the potential to adversely impact UAU groundwater quality continues. Therefore, predicting time frames for cleanup of the UAU by natural attenuation or extraction is not possible at this time.

RESPONSE:

EPA's ROD requires remedial action at all identified sites of soil contamination presenting unacceptable threats to underlying ground water. We agree that time frames for cleanup of the UAU under any set of conditions cannot be reliably predicted at this time. EPA is encouraged by observations of natural reductions of VOC levels beneath the Motorola GEG facility in the UAU.

APPENDIX A, Potential Sources
(31.) Table A-10

Potential sources of contamination are identified without comment as to sampling, exposure or indication that remediation might be required.

RESPONSE:

Table A-10 is a summary of potential sources of contamination and is not intended to provide comment pertaining to sampling exposure or remedial action. See Chapters 2 and 7 for comments and actions pertaining to these questions.

APPENDIX I, ARARS Analysis for the NIBW Site
(32.) General Comments

The Applicable, or Relevant and Appropriate Requirements (ARARs) of the proposed remedial actions for North Indian Bend Wash were determined and transmitted to the EPA. Specific comments on State generated ARARs are:

a. **As stipulated under Arizona Revised Statutes (A.R.S.) 49-224, all aquifers in the state are classified as drinking water aquifers.**

This classification is more stringent than federal standards. Appendix I confirms this ARAR but the question must be raised as to the efficacy of the preferred alternative as actually meeting this ARAR. This ARAR has been presented and made an ARAR in the ROD of all NPL sites in the state that have RODs. To maintain the required consistency for

maintaining an ARAR, the North Indian Bend Wash ROD must also meet this ARAR.

b. **Assure the protection of public health and welfare and the environment.**

This State ARAR was not included in the list of state ARARs. Certain hazardous substances which have been detected in samples have not been included on the list of chemical specific ARARs and without those being included as constituents which must be treated to MCLs, the treatment would not assure protection of public health and welfare and the environment.

c. **To the extent practicable, provide for the control, management of clean-up of the hazardous substance so as to allow the maximum beneficial use of the waters of the state.**

This State ARAR was not included in the list of state ARARs. Certain hazardous substances have not been included on the list of chemical specific ARARs and without those being included as constituents which must be controlled and cleaned up, the treatment would not allow the maximum beneficial use of the waters of the state. The Arizona Department of Environmental Quality Human Health-Based Guidance Levels for Contaminants in Drinking Water and Soil should be used as guidance for getting soil cleanup levels since the federal government has no standards for soil contamination.

d. **After remedial action, the contaminants remaining in the aquifer(s) shall be in compliance with the following maximum contaminant levels (MCLs) stated at 40 CFR 141.11:**

Chromium **.05 mg/l**

The new MCL of 0.1 mg/l is listed an as ARAR, however the Arizona standard duly promulgated is still the old MCL and since it is a more stringent standard should be the ARAR. The Arizona standard has not been included on the table of Chemical Specific ARARs. It should be noted that the State must adopt MCLs as Aquifer Water Quality Standards (AWQS) within one year of MCL promulgation by EPA. The State AWQS must be at least as stringent as the EPA MCL. At this time, it is not known if the State will adopt the new chromium MCL as an AWQS.

Vinyl Chloride **.002 mg/l**

This specifically identified contaminant has not been included on the list of chemical-specific ARARs.

e. **During groundwater treatment, air emissions shall be treated to meet Maricopa County Air Quality Standards (Rules 210 and 320 and any updates thereof) as dictated by the Clean Air Act**

The Appendix states that if the Rules are included with the State Implementation Plan (SIP), they will be ARARs. The SIP is waiting approval by the EPA. The Rules have been duly promulgated and the substantive requirements should be met.

f. **Within 100-year floodplain must conform to 40 CFR 6 and 40 CFR 264-18**

The explanation in Table I-3 (3) as to the breakage of pipes and wells is unclear. Are the pipes and wells to be placed in such a position that any contaminated water would be in an aquifer or would the contaminated water become surface water and as such enter the recreational ponds of the Indian Bend Wash, or the swales near residential areas adjoining the Wash as overflow areas, the streets of Scottsdale and Tempe or onto the Salt River which flows heavily during flood events?

g. **Preserve artifacts**

Artifacts have been found in many areas close to the IBW site. Therefore preservation of artifacts should be a listed ARAR.

RESPONSE:

a. EPA believes the selected remedies for NIBW comply with Arizona's ARAR regarding aquifer classification.

b. ADEQ identifies the requirement to "assure the protection of public health and welfare and the environment" as a State ARAR, but does not cite the source of this requirement. Nevertheless, CERCLA and the NCP mandate that EPA meet this requirement, so the potential State ARAR would not be more stringent. As stated throughout the ROD, EPA has determined the selected remedy meets this requirement. EPA believes the ROD identifies chemical-specific ARARs, other criteria and selected standards, as appropriate, for all hazardous substances detected at the site.

RESPONSE (Continued):

c. EPA agrees with ADEQ's comment regarding maximum beneficial end use. The state requirement for maximum beneficial end use has been identified as an ARAR in Appendix A of the ROD. In addition, at 40 CFR 300.430(a) (1) (iii) (F), the NCP states EPA's intent regarding return of ground water to beneficial end use. EPA has determined the end use for water treated by the Scottsdale Operable Unit remedy meets this requirement. For soils, EPA has included in the ROD the ADEQ Health-Based Guidance Levels among the other performance standards with which the selected remedial actions must comply.

d. EPA agrees with ADEQ's comments regarding chromium and vinyl chloride. The relevant changes have been included in Appendix A of the ROD.

e. While the cited are not ARARs because they are not yet incorporated into an EPA-approved State Implementation Plan under the Clean Air Act, EPA has included the substantive requirements of Rules 210 and 320 among the other criteria with which NIBW remedial actions must comply.

f. If there is breakage at the wellhead during flooding, water still in the aquifer formation would not be expected to flow to the surface. Water from a breaking pipeline could be released into a surface (or near-surface) water, but adverse impacts would be minimized because of (1) dilution with the flood waters that caused the break, and (2) expected resulting surface recharge of the contaminated water into a regional UAU that is already contaminated (i.e., appreciable uncontaminated ground-water resources should not be impacted).

g. The RI/FS identified the National Archaeological and Historical Preservation Act, 16 USC Section 469, as an ARAR for NIBW. The Act requires preservation of significant scientific, prehistoric, and archaeological data.

(33.) Specific Comments

Page I-23

The following paragraph should be added to the section entitled "Non-ARAR criteria to be considered".

> The Arizona Department of Environmental Quality has developed a draft document entitled "Human Health-Based Guidance Levels for

Contaminants in Drinking Water and Soil" (September 1990), which lists health-based guidance levels in drinking water and soils for 230 chemicals. These guidelines are not promulgated.

RESPONSE:

EPA has included in the ROD ADEQ's Health-Based Guidance Levels among the other performance criteria with which the selected remedial actions must comply.

Page I-28

The following should be added to Table I-5 in the section entitled "Non-promulgated State Advisories".

Human Health-Based Guidance Levels for Contaminants in Drinking Water and Soil, Arizona Department of Environmental Quality (September 1990).

RESPONSE:

HBGLs are included as TBCs in the ROD.

APPENDIX J, Analysis of Groundwater Extraction Alternatives
(34.) Page J-15, second paragraph, first sentence

Are the production wells described as "abandoned", in fact, just not currently in use?

RESPONSE:

The term "abandoned," as commonly used, means of unknown condition other than that the well is not a currently active production well.

(35.) Page J-15, second paragraph, last sentence

Is the "leakage out of the UAU" attributed to infiltration into the MAU or migration down well borings?

RESPONSE:

The term "leakage," as commonly used, means movement of ground water through the porous media. It does not include cascading down wellbores.

(36.) Page J-16, "Approach to Extraction"

Is it reasonable to expect observed conditions to persist, considering the drastic decline in the UAU water table between 1940 and 1965 and observed reactions to flows in the Salt River?

RESPONSE:

The drastic declines in the UAU between 1940 and 1965 were attributed to direct pumping from the UAU. Wells in the NIBW area were deepened into the MAU between 1962 and 1968. UAU decline slowed dramatically after approximately 1965. Review of UAU hydrographs between 1920 and 1989 led to the expectation that the UAU will behave in the future as it has since 1965, given similar recharge and pumping conditions.

(37.) Page J-32, "Groundwater Flow Simulation for the UAU"

Based on the known heterogeneity of the MAU, the model assumptions that vertical hydraulic conductivity, transmissivity and specific storage are homogeneous may limit the ability of the model to simulate actual conditions and should be considered when interpreting model results.

RESPONSE:

The sensitivity analyses indicate that the uncertainty associated with these specific features will have an insignificant impact on the evaluation of ground-water flow in the NIBW.

(38.) Page J-32, second bullet

Why are available data insufficient?

RESPONSE:

This is a professional judgment based on evaluation of data available at that time and of the uses to which the data would be put. Potential data on mobile-immobile fraction and rate-limited sorption coefficients (on several scales) are needed. Additional well installation and remedial action systems observation will improve our ability to make these calculations.

(39.) Page J-36, third paragraph

If, as stated (Vol. 1, p. 3 - 51), that there "are at least 26 water supply wells in NIBW which are perforated across the saturated UAU and lower units, that could serve(d) as discharge paths," why is it assumed that discharge through these wells is negligible? It could, indeed, be that in excess of 25% of the total recharge by lateral flow across the eastern boundary of the model area is migrating downward into the MAU and LAU via these wells.

RESPONSE:

ADEQ should note that this judgment is made strictly for the purposes of conducting the model simulation. As used in the referenced paragraph of the RI/FS, the statement is believed to be correct.

APPENDIX K, VLEACH Model Study

(40.) Page K-12, Table K-3

Why are the values in this table so different from those in Table K-3 of the Committee Draft?

RESPONSE:

Based on Project Committee review comments, the data were reevaluated, and the table was revised.

(41.) Page K-31, Groundwater Impact Calculation

In Chapter 3 of the RI/FS, porosity of the UAU was stated to be 30 to 35 percent. Why was 40 percent used in the mixing cell calculations?

RESPONSE:

Ground water was assumed to be moving in the MAU in Areas 7 and 8 for the purposes of VLEACH-related calculations; the MAU is believed to have higher porosity than the UAU.

APPENDIX L, ADWR Groundwater Flow and Contaminant Transport Modeling

(42.) Page 93 - 94, Transport Modeling Assumptions

The model assumed no adsorption of TCE to the aquifer materials, therefore, no retardation of contaminant was included. This is believed to be a significant source of error in evaluating the effectiveness of the remedial alternatives. Based on values of bulk density, K_{oc} and f_{oc} previously reported in the RI/FS, dissolved TCE is estimated to travel at only 0.75 times the rate of groundwater flow. Therefore, assuming no retardation in the model underestimates the time necessary for the TCE to be removed from UAU groundwater as a result of natural flow conditions.

RESPONSE:

Retardation could occur and lengthen the required time of remedial action pumping.

Vadose zone contamination has not been clearly defined for possible sources of UAU groundwater contamination. Therefore, no remedial actions are planned for the immediate future. If the vadose zone is determined to be a continuing source, the assumption that solvent sources in the vadose zone may be neglected could also introduce error in the model.

RESPONSE:

The assumption seems appropriate in light of EPA's selection of SVE for any vadose zone areas presenting an unacceptable threat to ground water.

The mass of contaminants used to estimate the effectiveness of the three proposed extraction alternatives is too low. Using TCE as a target compound to identify the areal extent of groundwater contamination may be appropriate but significant volumes of other contaminants should have been considered in estimating the mass of contaminants removed by the different extraction alternatives. ADWR's modeling indicates that the most effective alternative (Alternative 1R) is estimated to remove approximately 80 gallons of TCE from the UAU. This volume of TCE appears inconsequential but it is enough to contaminate 67,500 acre-feet of groundwater at the MCL of 5 µg/l. This volume of water is equivalent to approximately seven years of OU pumping or 10 square miles of UAU if the porosity is 30% and average saturated thickness is assumed to be 35 feet. If all VOCs are included in the calculated contaminant mass, the extraction alternatives should indicate a more effective mass removal than the modeling indicates.

RESPONSE:

Evaluating all VOCs would increase the estimated mass removal rates. This was done in the RI/FS (see Table 9-7; also 9-1, 9-2, and 9-3).

ADWR simulated the two proposed UAU extraction alternatives with and without recharge. No recharge was simulated for extraction alternative 3. Based on the location of UAU extraction wells in areas of low saturated thickness in the MAU, it is not surprising that certain blocks are dewatered over the period simulated in the modeling.

In Conclusion, ADEQ objects to implementation of Alternative 2 as a final remedy for groundwater. As an operable unit dealing with vadose zone contamination, Alternative 2 would likely prove to be adequate. ADEQ strongly recommends that EPA reconsider Alternative 5, in combination with pumping from SRP Well 22.5E,6N (as well as other large production wells in the area). ADEQ believes efforts must be made to prevent downward migration of contaminated UAU groundwater and resultant continued degradation of these MAU and LAU.

RESPONSE:

As stated in Section II.H of the ROD, EPA does not believe the added effectiveness of alternatives with UAU ground-water extraction is proportional to the added costs of those alternatives. With the required monitoring, the selected alternative offers virtually the same overall protection at significantly less cost.

COMMENTS FROM ARIZONA DEPARTMENT OF WATER RESOURCES

GENERAL COMMENTS

In general, ADWR believes the North IBW Scottsdale OU Proposed Plan to be a positive beginning to groundwater remediation at NIBW. While the Department believes the OU should proceed as scheduled, we have some areas of concern.

1. Red Unit: The RI/FS indicates that the Paradise Valley Water Company operates several wells that are screened across the Red Unit. Although the Red Unit is an important aquifer in the area, very little is known about water quality and hydrology in this aquifer at NIBW. While ADWR does not propose any Red Unit investigations at this time, we believe the Proposed Plan should at least mention that the aquifer is important and will be investigated and remediated, if necessary, in the future.

RESPONSE:

Although the Red Unit's occurrence cannot yet be described at NIBW, EPA agrees that the Red Unit could be important as an aquifer. Red Unit investigation and possible remedial action may be appropriate in the future.

2. Paradise Valley Water Company (PVWC): As yet, groundwater monitoring has not determined the northern limit of contamination but has indicated LAU contamination above MCLs at well PA-6LA, about one mile south of the PVWC wellfield. Because PVWC pumping has produced a large cone of depression, migration of contamination toward the wellfield seems likely. ADWR suggests close monitoring of water quality data from wells upgradient of PVWC and the consideration of contingency plan to provide potable water should PVWC wells become contaminated.

RESPONSE:

EPA shares your concern regarding potential contamination of PVWC wells. EPA recently has received a proposal from several NIBW PRPs for two additional LAU monitoring wells north of PA-6LA.

3. Possible Future Extraction Wells: Because new water quality data have changed our perception of contaminant distribution, two areas deserve early consideration for possible future extraction well placement. The new data indicate much higher concentration of contaminants at Areas 7 and 8 than previously known

and thus suggest consideration for extraction well installation. Another location is near monitor well PA-6LA which indicates contamination much further north than originally thought (see above comment regarding PVWC). The most effective location for this well could be determined by drilling additional monitor wells to determine the northern most extent of LAU contamination.

RESPONSE:

EPA will continue to pursue full implementation of the Scottsdale OU remedy, including capture of all VOCs above standards in the MAU and LAU. The proposed extraction locations are not directly relevant to the current remedy selection.

4. Upper Alluvial Unit (UAU): While ADWR does not believe that extensive UAU pumping for remediation is warranted at this time, options are available that could expedite cleanup of the UAU. Perforation of existing wells' casing across the UAU would hasten downward migration of contaminants. Bioremediation is another non-pumping remedial measure that should be considered.

RESPONSE:

EPA will rely on the selected additional monitoring to evaluate whether additional measures are necessary to expedite UAU cleanup.

FROM ADWR MODELING SECTION

The ADWR Modeling Section would like to offer its public comment on the draft UAU RI/FS concerning the analysis of this data and the efficacy of the Scottsdale OU (as analyzed by the ADWR Target model). One prediction that the model has provided is that the Scottsdale OU will be only about 80% effective in the remediation of groundwater contamination during a 50 year operational period. This prediction was based on TCE distributions which are now known to be substantially underestimated for MAU in the general vicinity of Areas 7 and 8. In addition, water quality data from monitor well PA-6LA show that TCE contamination in the LAU has spread much farther north than previously known. Since the original modeling results indicated that some contamination is already outside of the zone of capture of the Scottsdale OU wells, it seems prudent to suggest that the Scottsdale OU's ultimate success may be substantially improved by including two or more additional production wells. One well should be appropriately located in the vicinity of Areas 7 and 8. Another well should be located somewhere in the vicinity of PA-6LA, or even further north of that location. The most effective location for this well should be determined by drilling additional monitor wells to determine the northern-most extent of LAU contamination. The

ADWR model would also serve as a most useful aid in the well siting process. The implementation of this northern-most well along with the Scottsdale OU may prevent the Paradise Valley Water Company wells from ultimately becoming contaminated.

RESPONSE:

EPA will continue to pursue full implementation of the Scottsdale OU remedy, including capture of all VOCs above standards in the MAU and LAU. The proposed extraction locations are not directly relevant to the current remedy selection.

In conclusion, we feel that the Scottsdale OU is a worthwhile project which will substantially improve groundwater quality in the area over its lifetime, but we also feel that it could be and should be improved now, in the design stage, rather than as a retrofit.

FROM ADWR DEPUTY COUNSEL

The Department is pleased to see that Appendix I of the North Indian Bend Wash RI/FS ("Appendix I") recognizes that substantive portions of the Arizona Groundwater Management Act are potential ARAR's with respect to the North Indian Bend Wash site. The Department is concerned, however, with the classification process used in Appendix I to identify ARARs. At the outset, the discussion of ARARs identifies three categories of ARARs: chemical-specific, action-specific, and location-specific. The Groundwater Management Act is not discussed as an ARAR under any of these three categories. Rather, Appendix I classifies the Groundwater Management Act as "potential Non-Specific ARARs." A non-specific ARAR is described as an ARAR which cannot be classified as either chemical-specific, action-specific, or location-specific.

The Department is not aware that federal law or policy recognizes "non-specific" ARARs. Moreover, the Department believes that many of the Arizona Groundwater Management Act's provisions are potential action or location-specific ARARs. The Department requests that the classification be clarified and that the Arizona Groundwater Management Act be classified either as potential action or location-specific ARARs. The Department requests that this action be taken to prevent the potential argument that because non-specific ARARs are not recognized by law, any laws listed as non-specific ARARs are not ARARs.

RESPONSE:

The error cited in the comment was typographical rather than interpretive. Appendix A of the ROD now identifies appropriately the ARARs and other criteria for NIBW.

COMMENTS FROM FENNEMORE CRAIG

We appreciate the opportunity to comment on the Draft Remedial Investigation/Feasibility Study, EPA's Proposed Plan and the Administrative Record for the Northern Portion of the Indian Bend Wash Superfund Site. We represent several property owners with land located south of McKellips Road within the boundaries of the North Indian Bend Wash Superfund Site and Study Area as it is currently delineated. We understand that investigation by the Environmental Protection Agency, Region IX, has concluded that there is no soil or groundwater contamination south of McKellips Road within the North Indian Bend Wash Superfund Site. Essentially, this means that no one with property located south of McKellips Road caused or contributed to the contamination in the North Indian Bend Wash Superfund Site. These property owners, however, face declining property values and lending institutions that refuse to issue loans secured by property in this area based solely on the fact that their property is located within the boundaries of a superfund site. Some property owners even face foreclosure if unable to obtain financing secured by their property.

Given these circumstances and based on the definition of "on-site" set forth in the National Contingency Plan (40 C.F.R. § 300.5) as the "areal extent of contamination," the property owners request that the Environmental Protection Agency redefine the boundaries of the Indian Bend Wash Superfund Site to exclude the area south of McKellips Road where we understand there is no contamination. Enclosed are petitions signed by approximately 120 landowners requesting that the area south of McKellips Road be excluded from the boundaries of the Indian Bend Wash Superfund Site.

This is not to say that the property owners with property south of McKellips Road are not concerned with the proper remediation of soil and groundwater contamination because they are concerned and would like to see and fully support the speedy implementation of necessary response actions by those found to be responsible parties. The landowners simply request that the Environmental Protection Agency redefine the boundaries of the Indian Bend Wash Superfund Site in accordance with the definition of on-site in the National Contingency Plan to exclude the area south of McKellips Road where there is no contamination.

We attended the public hearing on May 8, 1991 in Scottsdale and chose not to present the enclosed petitions at that time. Our clients were willing to let the public health issues take precedence over their financial struggles. With homes and businesses at stake, however, our clients would appreciate rapid response. They would like the area south of McKellips Road excluded from the Indian Bend Wash Superfund Site before additional harm occurs. Again, we appreciate the opportunity to comment on the draft Remedial Investigation/Feasibility Study, EPA's Proposed Plan and the

Administrative Record for the Northern Portion of the Indian Bend Wash Superfund Site. Please contact me if you have any questions or need additional information.

RESPONSE:

Based on the information available to date, EPA does not consider the area south of McKellips Road as a current source of contamination at NIBW. However, available ground-water data indicate there is ground-water contamination south of McKellips Road. Tempe's Well No. 6, just south of McKellips Road, has been contaminated since at least 1982. Of all the monitoring wells at NIBW, however, only two recently installed wells are located south of McKellips Road. Although these two wells have not yet shown contamination, additional monitoring wells may be necessary in this area to define further the extent of ground-water contamination.

EPA has properly delineated this site in accordance with the NCP, and the delineation is consistent with the definition of "onsite" identified in the NCP. Section 300.5 of the NCP defines "onsite" to include "all suitable areas in very close proximity to the contamination necessary for implementation of the response action." As the southern extent of ground-water contamination remains uncertain, remedial action at NIBW requires data from the existing monitoring wells located south of McKellips Road and may require additional monitoring wells in that area.

Although CERCLA provides strict liability of current owners of facilities at Superfund sites, the statute provides a defense for "innocent landowners" in Section 107(b) (3). In addition, EPA's "Policy Towards Owners of Residential Property at Superfund Sites" and the proposed Lender Liability Rule are designed to minimize the impacts to a property owner who has not contributed to the contamination of a site. For discussion of these two policies, see Section B. Property Issues on page C-2 of this Appendix.

COMMENTS FROM
PATRICK J. CUNNINGHAM

Soil vapor extraction should begin in Areas 3, 5, 6, 9, 11 and 12 at the same date that that SVE begins in Areas 7 & 8.

Since SVE is so effective, we should not wait for further study of Areas 3, 5, 6, 9, 11 and 12. SVE has been touted as phenomenally successful in Goodyear. We should thus begin SVE on these areas, and particularly Siemans Area 6, Motorola Area 12, and the adjoining plume/Areas 5A B + C.

RESPONSE:

There are not sufficient data to evaluate the necessity of SVE at Areas 3, 5, 6, 9, 11, and 12. EPA agrees remedial action should start as soon as possible for those vadose zone areas presenting an unacceptable threat to underlying ground water.

COMMENTS FROM GERALD GLASSMAN

This letter provides Region IX of the United States Environmental Protection Agency ("EPA") with the preliminary comments of Plainville West, Inc. ("Plainville West") on the public comment draft of the Remedial Investigation/ Feasibility Study ("RI/FS") and the EPA's Proposed Plan for the North Indian Bend Wash ("NIBW"). The opportunity to comment on these documents is appreciated.

Please note at the outset that Plainville West ceased its active operations in August, 1990. Consequently, Plainville West lacks the resources and the capacity to adequately review the above-referenced Documents for purposes of providing meaningful input on primarily technical issues. We simply cannot assess the impact or validity of the conclusions reached by the EPA and its contractors. Nevertheless, we reserve the right to submit additional and supplemental comments to the EPA if resources somehow permit.

The purpose of this letter, then, is to make corrections to certain portions of the Documents and to restate our position respecting the purported liability of Plainville West for contamination in the NIBW area.

There are several factual errors in the Documents:

1. It is critical that the EPA and its contractors recognize and utilize the correct facts surrounding Plainville West's ownership and use of its property. Plainville West has only owned and operated the property located at 7811 E. Pierce Street, in Scottsdale, Arizona, from July 1, 1986 until the present. (As stated above, all operations at the facility ceased in August, 1990.) The 7811 E. Pierce Street property is the only property Plainville West has ever owned within the NIBW.

2. The EPA and it's contractors, as evidenced by the Documents, have consistently confused the facts. The record must finally be set straight. Plainville West conducted business under the name "Marro Plating" only during the period from July, 1986 to August, 1990. Prior to that, Technical Metal Finishing and William & Miles Munzer conducted business as Marro Plating at the 7811 E. Pierce Street property. Therefore, the Documents (as well as all future governmental documents) should distinguish between the operation of Marro Plating by Plainville West and the other entities which have previously owned or operated Marro Plating (i.e., Technical Metal Finishing and William & Miles Munzer). The EPA's use of the business name "Marro Plating" in the Documents is confusing and misleading. Furthermore, Plainville West is unaware of, and has absolutely no connection with, the "Marro Plating" which the EPA identified in the Documents as within Area 8 (the present

Executive Auto Sales Property, located between Scottsdale Road and Brown Avenue). Plainville West (doing business as Marro Plating) only operated the 7811 E. Pierce Street facility in Area 3, and only between July, 1986 and August, 1990. The EPA must make a concerted effort to carefully distinguish between the various entities doing business as "Marro Plating" which are identified in the Documents. To do otherwise will be extremely damaging to Plainville West and possibly the other parties involved. There are certainly important remedial differences which impact the "Marro Plating" of Area 3 and "Marro Plating" of Area 8.

3. The Documents do not reference the April 3, 1989 Scott, Allard & Bohannan, Inc. report ("Report"), which concludes that the 7811 E. Pierce Street property was not a source of VOC or other groundwater contamination in the NIBW. The physical testing which was included in the Report showed no detectable concentrations of VOC's. Equity requires that this Report be referenced in the text of the Documents and the bibliography. It is a credible and available scientific study relevant to the NIBW. Region IX has been supplied this Report on several prior occasions.

4. The discussion in the Soils Investigation section of Volume 1, at page 2-18, states that a soil matrix concentration of 6 ppb of TCE was detected at ADHS soil sample location Y-1125 (adjacent to 7811 E. Pierce Street property) by ADHS tests conducted in December, 1981. The Documents do not reference, however, the September 21, 1982 memorandum of Mr. Bruce Scott ("Memorandum"), an employee of the Arizona Department of Environmental Quality. In his Memorandum, Mr. Scott discredits the analytical results set forth in the Soils Investigation section because of TCE contamination of the testing capsule. Again, EPA and CH2M HILL seem to conveniently disregard mention of this important Memorandum written contemporaneously with the ADHS tests. The Scott Memorandum was furnished to EPA Region IX on several occasions by both Plainville West and the Munzers.

5. Plainville West never used or stored any trichloroethene ("TCE"). Only limited quantities of trichloroethane ("TCA") were used or stored at the Plainville West facility, and all supplies were used in the normal course of business. No quantities of TCA were ever released to the surface or subsurface at this property. Plainville West adopted and utilized a policy of proper handling of all hazardous materials and substances. Plainville West has had no releases of solvents to dry wells, surface pits, ponds, or lagoons. Table A-4 of Appendix A (Volume 2) supports this contention. This Table provides that waste hauling and recycling were the "methods of release". Plainville West's activities did not "release" any substances into the NIBW environment. Consistent with our comments above, this Table should be revised to separate out

the individual occupants. To this end, Plainville West occupied the 7811 E. Pierce Street facility only from July, 1986 until present.

Plainville West's predecessors, Technical Metal Finishing and William & Miles Munzer (which also conducted business under the name "Marro Plating") used and stored TCE. Both Technical Metal Finishing and the Munzers also used TCA. CH2M HILL's February 1988 technical studies on the 7811 Pierce Street property indicated no VOC's of any type, and in particular, no concentrations of TCA.

As a general comment, Plainville West supports those remedial measures which are necessary to protect the public health and the environment. The government must consider, however, the incredible cost impact that this process can have (and already has had) on a small business such as Plainville West. The NIBW Superfund remediation was a clear and substantial factor in our decision to close Plainville West's doors.

In conclusion, I wish to emphasize our position that Plainville West has done nothing to contribute to contamination in the NIBW. In addition, we believe that the Documents referenced above omit important facts and misstate others. Because of the company's lack of financial resources, we have been able to provide only general, initial comments to the Documents. However, we intend to supplement these comments as resources permit. Please address all future correspondence to:

Plainville West, Inc.
7811 E. Pierce Street
Scottsdale, AZ 85257
Attn: Gerald Glassman

RESPONSE:

EPA appreciates the information provided and has incorporated the information into the ROD, as EPA has determined appropriate. As presented in the RI/FS, EPA's sampling results for Area 3 do not support the assertion that the 7811 E. Pierce Street property was not a source of VOC ground-water contamination at NIBW.

COMMENTS FROM THE MARK GROUP

Relevant RIFS Section(s): CHAPTER 1

POTENTIAL SOURCES

HISTORICAL INFORMATION AND DISPOSAL ACTIVITIES AS CRITERIA FOR DISTINGUISHING POTENTIAL SOURCE AREAS MUST BE ACCURATE AND APPLIED CONSISTENTLY THROUGHOUT THE NORTH INDIAN BEND WASH (NIBW) AREA.

- o Location of alleged TCE disposal by Beckman in Area 3.
- o Classification of areas as source areas instead of potential source areas.
- o Inconsistent application of identifying criteria in distinguishing potential source areas.

1. Historic solvent use and disposal activities within the North Indian Bend Wash (NIBW) area were examined by the EPA to identify sources of soil and groundwater contamination.

   - The historic information is not correctly presented in the RIFS for Area 3, which includes the former Beckman site. The alleged release on the ground surface was within the northwest corner of the former Beckman Facility (MARK Group, 1988, p.19 and Drawing 2-2) and not in the northwest corner of Area 3. In Appendix A, Table 4, the surface disposal at the former Beckman facility should be listed as alleged since the statement obtained through an EPA interview of a former Beckman employee has never been substantiated. Soil gas and soil sampling in northwest corner of the former Beckman site found insignificant quantities of TCE, PCE, 1,1,1-TCA and CFM.

2. EPA should consistently apply their criteria for delineating source areas.

   - EPA identified potential source facilities based on information about historic solvent use and disposal activities (pp. 1-17 to 1-18 and Appendix A). These facilities were in turn grouped by location into source area (p. 1-18). There may be more than one potential source facility within a source area. EPA does not explain how one or more potential source facility(s) became classified as source areas instead of potential source areas.

   - The grouping of potential source facilities into source areas appears to be somewhat arbitrary and the quality of information used to define source

areas very uneven. Area 4 was identified as a potential source area merely because the ponds in this area existed during the 1954 to 1967 period. No evidence is presented for historic use of solvents or of disposal activities. Of the three subareas of Area 5, 5a and 5c do not have potential source facilities within them. Area 5A (p. 1-22) is defined on the bases of activities in Area 6. EPA provides no method that distinguishes potential source areas in a consistent manner as was requested (Beckman Technical Comments, 1990).

RESPONSE:

Table 1 in the ROD reflects EPA's consideration of the comments regarding alleged disposal at the former Beckman facililty.

EPA believes the groupings of facilities/operations discussed in the comment should be referred to most appropriately as "potential source areas." The approximate boundaries of a potential source area do not necessarily signify that EPA considers each facility/operation within the boundaries a source of contamination.

Relevant RIFS Section(s): CHAPTER 2

VADOSE ZONE STUDIES

HIGHER TCE CONCENTRATIONS IN AREA 3 ARE CONCENTRATED IN THE NORTHERN HALF OF AREA 3 AND APPEAR TO BE DERIVED FROM LOCAL SOURCES IN THE VICINITY OF PIERCE STREET. IN CONTRAST, TCE OCCURS IN VERY LOW CONCENTRATIONS IN THE SOUTHERN HALF OF AREA 3. ALL OF THE VALUES IN THE SOUTHERN PORTION OF AREA 3 ARE LOWER THAN THE TCE CONCENTRATION IN THE SOIL BORING SAMPLE WITHIN AREA 10. FOR CONSISTENCY IN THE DECISION PROCESS, EPA SHOULD, AS WAS DONE IN AREA 10, RELEASE THE SOUTHERN HALF OF AREA 3 FROM THE NEED FOR FURTHER STUDY.

- The uneven application of criteria for selection of areas for further study necessitates a comparison between areas.
- Area 10, despite a vadose zone profile indicating TCE levels above threshold value, has been characterized as an area requiring no further study.
- Fifteen out of 33 shallow soil gas samples are above the 10 µg/l threshold in the northern half of Area 3.
- Shallow soil gas concentrations in the northern half of Area 3 appear to be related to sources in the immediate vicinity of the samples.

- o Soil boring 3-213 in the northern half of Area 3 has a TCE profile directly related to the immediate vicinity of the boring, not to earlier shallower water tables.
- o The southern half of Area 3 is not the source of contamination to the north.
- o The southern half of Area 3 should be released from the need for further study.

1. EPA states (Vol. I, p. 2-1) that comparisons should not be made between areas because of variations in the quatity [sic] of available information. It is essential that comparisons be made within and between areas given EPA's questionable methods for selecting source areas needing further study and its uneven application of these methodologies.

   - Area 10 was selected as a potential source area because of the presence of a VOC generating facility and an unspecified event related to a hazardous waste response team visit. In Area 10 a soil vapor monitoring well detected TCE at 0.58 µg/l (depth of 60 to 75 feet) and 29.0 µg/l (depth of 93 to 113 feet). The water table was at 199 feet. Soil sampling analyses detected no VOCs, but no shallow soil gas work was done. EPA concluded that no further study was necessary because the TCE may have diffused upward from the water table through some 50 feet of loamy, sandy gravel. Area 10 (Figure 3-40) is downgradient from other sources. One of the assumptions in the VLEACH model used by EPA to evaluate the potential for groundwater contamination is that there is no gaseous diffusion of VOCs from the water table to the vadose zone. If gaseous diffusion upward from the water table is not important, then at a minimum a shallow soil gas survey should have been performed to explain the TCE profile in the vadose zone.

   - The spatial distribution of TCE above the threshold 10 µg/l in Area 3 is strongly skewed toward the northern half of the area, in the vicinity of Pierce Street (Vol. I, Figures 2-4, 2-5, and 2-6). Drawing 1 is a histogram illustrating frequency of TCE concentrations for Area 3, contrasting the former Beckman site (southern half of Area 3) and the northern portion with Marro/Plainville West and Genesis II Facilities. Out of 38 shallow soil gas samples in the southern part of Area 3 only two values were slightly above the 10 µg/l threshold (11.0 µg/l and 12.5 µg/l). The histogram includes EPA samples and MARK samples (Appendix C, Table C-6). Over half of the shallow soil gas samples were collected in the northwest corner of the former Beckman Facility. (Vol. I, Figure C-1), site of the alleged discharge. Neither of the near threshold samples occur in that area. Soil boring samples were all non-detect for TCE at the former Beckman site. A soil vapor monitoring well (D-2) in the northwest corner of the former Beckman site, in an area where the shallow soil gas samples are all below the 10 µg/l threshold shows TCE ranging from non-

detection to 0.27 µg/l. (The latter value is just above the 0.25 µg/l threshold related to EPA's standard for field sampling equipment contamination levels.) The second soil vapor well in the southeastern portion of the former Beckman site was non-detect for VOCs. What TCE does occur in the southern half of Area 3 is of a very low concentration and is confined to the shallow soil gas zone of surface to a depth of six feet. None of the TCE values in this southern half of Area 3 approach the TCE concentration reported in Area 10 yet that area is dismissed from further study.

- In the northern half of Area 3, 33 shallow soil gas samples were taken. Of these, 15 (Drawing 1) are above the 10 µg/l threshold including three samples in the 30 to 40 µg/l range. A sample from a soil boring immediately behind the Plainville West/Marro Plating facility (Vol. I, Figure 2-5) had 6 µg/l of TCE.

- TCE concentrations in the vicinity of the Plainville West/Marro Plating and Genesis II sites are significantly higher (e.g. 27, 23, 37.7 and 38 µg/l) than any to the south and indicate that the norther area may require further study. Since these are shallow level (<6 feet depth) concentrations and are well above historic static water levels in UAU, it is evident that these concentrations record local sources and cannot have been transported by advective processes from elsewhere in Area 3.

- EPA soil boring 3-213, located 45 feet south of the Plainville West/Marro Plating facility (Figure 2-5), extends to a depth of 112 feet. Soil vapor measurements show a downward profile of increasing TCE with depth (e.g. 4 to 6.5 feet - 0.46 µg/l, 13 to 18 feet - 8.4 µg/l, 30 to 45 feet - 110.0 µg/l, and 55 to 79 feet - 260 µg/l). These shallow concentration levels, spread across the vadose zone, are unlikely to be related to VOCs volatilizing from the water table. The downwardly increasing concentrations of TCE across the vadose zone at 3-213 are the result of surface or near-surface sources in the immediate vicinity of the soil borings. In contrast, the absence of significant concentration of TCE in soil borings to the south indicates the southern area is not a source of VOCs for the northern area.

- If additional soil vapor monitoring wells, as proposed by EPA (Vol. I, p. 2-29), are located in Area 3, they should be in the northern half of the area. The higher concentrations of TCE in the vicinity of the Pierce Street facilities are directly related to those local sources versus local sources to the south.

- Given the great disparity in the distribution of TCE over Area 3 and the obvious localization of sources in the northern half there is strong technical basis to release the southern half of Area 3 from the need for further

study. Since Area 10 has a TCE depth profile with higher values than the south half of Area 3 and was released from the need for further study, the same decision should be applied to the former Beckman site by EPA.

RESPONSE:

At Area 10, TCE (29 µg/l) was detected at 93 to 113 feet where the water table was at 119 feet, not 199 feet. EPA determined no further study was necessary because TCE and PCE readings of 29 and 15 µg/l are probably caused by contaminant diffusion from immediately adjacent UAU ground water. (Refer to 2-73 paragraph 4.)

The VLEACH modeling effort acknowledges that gaseous diffusion from the water table to the vadose zone occurs; however, that contaminant transport process is not considered in the estimation of potential impacts to the ground water. The inference that EPA feels there is no gaseous diffusion from the water table to the vadose zone is not accurate.

The MARK Group suggests a shallow soil gas survey should have been performed. This would not have been appropriate at Area 10 due to the nature of the release. The incident was a release of methylene chloride due to a spill. The City of Scottsdale sent a response team to the site, and a removal of surficial soil was performed. EPA followed up with the soil boring and sampled soils for 8010 and 8020 parameters. The boring was completed as a soil vapor monitoring well. EPA's interest was in contaminants that may have been below the soil excavated by the response team. A shallow soil gas survey would not have been appropriate because the spill location was identified ("hot spot" identification was not an issue), and the shallow soils were removed.

It is not clear where The MARK Group is dividing Area 3 into a "northern half" and "southern half." If the dividing line is Pierce Street, then the comment is inaccurate. Thirteen out of 34 soil gas samples taken south of Pierce Street were at or above 10 µg/l. Also, a soil vapor monitoring well with four probes screened at different intervals (located in Boring 3-213, south of Pierce Street) was found to have TCE concentrations as high as 260 µg/l. Two additional wells are being required to provide additional characterization in the areas of highest shallow soil gas concentrations. If the data from these wells indicate there is no further study required, then at that time, Area 3 will be released from further investigation.

It is important for The MARK Group to review the locations of the required soil vapor monitoring wells. They are placed between soil gas Locations G001 and G002, and near Pierce Street, north of soil gas Location 101.

Relevant RIFS Section (s): CHAPTER 3

HYDROGEOLOGICAL CONDITIONS IN THE NIBW AREA

SMITHKLINE SUPPORTS THE EPA'S SELECTION OF REMEDIAL ACTION ALTERNATIVE 2, WHICH REQUIRES CONTINUED MONITORING OF UAU BUT NOT UAU PUMPING. HOWEVER, THE PROCESS USED BY EPA TO REACH A DECISION FOR THE EXTRACTION ALTERNATIVE SHOULD BE SUPPORTED BY INTEGRATING ALREADY-KNOWN ADDITIONAL ELEMENTS INTO THE HYDROGEOLOGICAL CHARACTERIZATION OF THE UAU.

- Textural andhydrologic parameters in the UAU are spatially variable over the NIBW area as has been recognized by EPA in the Middle Alluvial Unit (MAU).
- Textural variability in UAU can be recognized from lithologic and geophysical logs. The impact of this variability on the UAU hydrology is illustrated by spatial changes in hydraulic conductivity and hydraulic gradients.
- Soil borings from the upper UAU show an abundance of fine-grained sediment with lenses of gravel/sand and caliche or hardpan, further indicating the heterogeneity of the UAU.
- Heterogeneity in the vadose portion of the UAU invalidates the homogeneous assumption for the VLEACH model.
- Southwesterly flow directions cover a wider area in Sections 1 and 2 of T1N R4E and have been consistently so for a number of years.
- ADWR modeling further substantiates this southwesterly flow pattern.
- The MAU ridge strongly influences flow directions, hydraulic gradients and both the spatial distribution and amount of unsaturated UAU.
- Equipotential lines illustrated in the ADWR modeling work (Vol. I, Appendix L) indicate vertical as well as horizontal flow within the UAU.
- Spatial variations in the thickness of the unsaturated portion of the UAU are influenced by seasonal recharge/discharge and therefore impact flow gradient and direction. It is essential to present this information in a sequence of maps rather than as a single map of average thickness.
- Spatial and temporal variations in recharge/discharge create transient stresses that influence flow patterns such that the use of average water level maps for a large block of time loses the dynamic character of the UAU groundwater system.
- The annual changes in recharge/discharge stresses should be included in the ADWR modeling.
- The influence of MAU water levels on UAU water levels due to pumpage represents another transient stress that impacts the UAU groundwater system.

- o Two different factors, (1) surface disposal and, (2) groundwater transport are of importance in understanding the distribution of TCE.
- o Increase in TCE concentrations are more closely related to water level rise in near-source wells than in downgradient wells contaminated by VOCs transported in by groundwater. TCE concentration increases do not match hydrographic data in the downgradient wells.
- o Monitoring wells close to the source of recharge will show dilution and declining TCE concentrations, while downgradient wells close to the center of the mass of the migrating TCE plume will show little change in concentration with time.
- o TCE concentration contours are strongly influenced by the MAU Ridge. Concentration gradients and dispersivity are also influenced by the configuration.
- o TCE concentration vs. time graphs in Appendix F are not legible because of the superposition of data points for different VOCs.

1. EPA continues to characterize the Upper Alluvial Unit as a relatively homogeneous hydrostratigraphic unit despite contrary evidence from soil boring and monitor well logs.

   - Although EPA, based on lithologic and geophysical logs, has recognized (p. 3-56) a northeast-southwest zone of higher hydraulic conductivity in the upper part of the MAU, it has not acknowledged significant textural and hydrological variations in the UAU (Vol. I, pp. 3-20, Vol 4, pp. J-4, J-32).

RESPONSE:

We do not yet acknowledge distinct lateral variations in the saturated UAU's lithology based on available data.

   - Examination of borehole lithologic and geophysical logs suggests significant vertical and lateral variation in the textural and hydrologic properties of the lower, saturated portion of the UAU. This is further supported by the hydraulic conductivity map (Vol. I, Figure 3-11) which shows a wide variation in the hydraulic conductivity values in the UAU. Strong deflections on the spontaneous potential (SP) logs, along with supporting lithologic data, indicate relatively permeable sand and gravel in the basal UAU for some boreholes (e.g., EPA-1 and M-9UA). In contrast, relatively flat SP traces (e.g., M-IUA) to serrated traces (e.g., M-3UA, M-4UA) suggest higher amounts of silt/clay as lenses and/or matrix in the lower UAU. This is of some significance since areas of UAU with higher hydraulic conductivities will transmit UAU groundwater to the MAU more readily than areas with lower hydraulic conductivity.

Lateral variations in texture and lower hydraulic conductivity may influence hydraulic gradients as illustrated by the steepening of the horizontal gradient in parts of Section 2, T1N, R4E (e.g., Vol. I, Figures 3-40 and 3-11). Dispersivity may change as a consequence of these lateral variations in texture. The use of constant ratio of longitudinal to transverse dispersivity of 10:1 (Vol. 5, Appendix L, p. 82) in the modeling is an oversimplification of aquifer parameters.

RESPONSE:

We believe the SP logs are not definitive enough to reliably make the judgments The MARK Group makes in this comment. The comments on dispersivity and small-scale flow paths are not germane to the evaluation of alternatives.

- Soil boring logs from Area 3 through Area 10 on the south, to Area 7 and 8 on the north illustrate that the upper 20 to 30 feet of the UAU vadose zone is heterogeneous. The upper zone consists of silt, clay and sandy gravelly silts and clays with lenses of "hardpan" and/or caliche. To the east in Area 6, this upper zone is thinner and the heterogeneity is also present.

RESPONSE:

This is noted in the RI/FS report.

- The presence of strongly contrasting layers of different permeability over a significant thickness of the upper vadose zone in a wide area on the NIBW site presents a serious challenge to the homogeneous UAU vadose assumption in the VLEACH model (Vol. 4, Appendix K).

RESPONSE:

The MARK Group does not address the consistent manner in which the threefold layering at Areas 7 and 8 is clearly addressed in our application of VLEACH. Direct handling of vertical heterogeneity can be added to VLEACH, if needed.

2. EPA has recognized westerly to southwesterly flow directions in the UAU (Vol. 1, pp. 3-19, 3-103) but this flow pattern is not just confined to the southern half of section 1 (T1N, R4E) as implied by EPA.

- Examination of water levels maps for the UAU shows that the southwesterly flow pattern includes nearly all of Section 1 and extends across the eastern half of Section 2 (Vol. 1, Figure 3-40) on the winter map and that this pattern continues through the summer (Vol. 4, Figure J-5) involving the southern half of both sections. This Section 1 pattern is significant because the TCE plume, which is also illustrated on Figure 3-40, spreads across the western half of Section 1 and westward, in a downgradient direction, beneath Section 2. EPA further notes that the hydraulic gradients in 1984, 1985, 1986, 1987, and 1988 were greater in magnitude, but similar in direction to those on the July 1989 map (Vol. 1, p. 3-19). The southwesterly flow direction has been a feature of the UAU for a significant period of time.

RESPONSE:

The small scale in hydrogeologic features of interest to The M K Group is not germane to the selection of remedial action for the UA For the purpose of separating sources, evaluations of this type coulc be useful. However, this was not a specified objective of the NIBW RI/FS.

- The MODFLOW simulation of the UAU water levels (Vol. 4, Figure J-18) also shows the southwesterly flow directions across Sections 1 and 12 to the south. It also shows the steepening of gradients across the ridge that results from reduction in saturated thickness. Southwesterly flow directions are strongly illustrated in the January 1983 water level map (Vol. 5, Appendix L, Figure 20).

RESPONSE:

EPA agrees with the observation regarding the MODFLOW simulation.

3. EPA has acknowledged (Vol. 1, p. 3-20), but not fully recognized the extent the elevation high on the base of the UAU (i.e., MAU Ridge) influences flow patterns in the UAU.

- If the axis of the MAU Ridge, based on the contour patterns of Figure 3-10, is plotted on UAU water level maps it shows that the axis extends in a southwesterly direction from M-15UA to M-5UA. South of M-5UA the axis curves to a more southerly direction (e.g., across Section 1), and farther south (in Section 12) the axis again swings to a more southwesterly trend. The saturated thickness of the UAU increases in a southwesterly direction (Vol. 4, Figure J-7) south and west of the ridge axis. The UAU water level contours tend to parallel the ridge axis,

and with the increasing thickness of the saturated UAU in a southwesterly direction, the flow direction is also to the southwest.

RESPONSE:

Lithologic data are not available immediately south and west of M-5UA to support the assertions made in this comment. At the closest available well site (E-13UA), drilling apparently did not reach the contact between the UAU and MAU.

4. EPA states (Vol. 4, p. J-32) that equipotential lines are essentially vertical for the UAU. The implication of vertical equipotential lines is that flow is entirely horizontal in the UAU. This seems to be at variance with parts of the water profile simulations and ground-water velocity vector profiles (Vol. 5, Appendix L, Figures 51-54). Substantial total recharge into the MAU is well recognized.

   - The water profile simulations (Vol. 5, Figures 51 and 53) suggest, for the area in the vicinity of McDowell Road southward, that the equipotential lines involving the UAU slope at a fairly low angle. This indicates a significant vertical component of flow in the UAU. These vertical components of flow also appear on the groundwater velocity vector profile (Vol. 5, Figures 52 and 54).

RESPONSE:

We remain convinced that head differences across the vertical dimension of the UAU are insignificant, especially for evaluation of flow within the UAU. Presentations of velocity vectors from finite-difference simulations are misleading in this regard. The finite-difference-derived velocity vectors and equipotentials cross the UAU/MAU contact in a manner which simplifies the behavior of ground water in contrast to its normally recognized behavior.

5. EPA recognizes that the thickness of the saturated portion of the UAU varies and that at times a portion of the UAU is dewatered. However, a map such as Figure J-7 showing the average saturated thickness for the period from June 1985 to June 1989, although useful for trends, smooths over annual variations in water levels and saturated thickness. These annual variations are important in establishing changes in flow directions and gradients. A sequence of summer/winter maps showing changes in saturated thickness would be more useful. It will be particularly important to consider post-1989 water levels and unsaturated zone thickness patterns, since these may significantly impact EPA's decision making process.

6. EPA efforts at modeling the UAU (Appendices J and L) have resulted in relatively small scale maps that generalize the hydrogeology of the UAU. Larger scale maps covering smaller areas and including summer as well as winter stresses would enhance the understanding of the hydrogeology of the UAU.

7. EPA's use of average water level elevations (see Vol. 4, Figure J-3) is not useful for understanding the hydrogeology of the UAU.

   - The UAU is a dynamic ground-water system with annual spatial and temporal variations in the recharge and discharge. Because of these variable stresses, flow conditions are transient and parameters like flow direction, gradients, and dispersion in the UAU are impacted.

   - The influence of these annual stresses needs to be incorporated in the future MODFLOW and TARGET studies (Appendices J and L). The use of static water levels for the winter months in the modeling (Appendix L, p. 92) is a case in point. The reason given for using the winter levels as a base is that the winter levels have recovered from the stresses of the heavy summer pumpage and the system is therefore quiescent. Although this might be useful for comparing years, reducing the influence of pumpage in the modeling smooths over the transient nature of flow patterns. It is also important to recognize that there is winter pumpage as illustrated in the recent GeoWest report of April 1991.

RESPONSE:

The data presentation in the RI/FS is sufficiently detailed to make the required evaluations. The small scale in hydrogeologic features of interest to The MARK Group is not germane to the selection of remedial action for the UAU. For the purpose of separating sources, evaluations of this type could be useful. However, this was not a specified objective of the NIBW RI/FS. The available hydrographs show strong recovery of the ground water in the MAU and LAU during winter months. As noted in the RI/FS, water level fluctuations at various time scales are present in the UAU.

8. EPA notes (Vol. I, p. 3-67) that water levels in the UAU are dependent on average water levels in the MAU and, therefore, are dependent on discharges from the MAU in a long term sense. Although long term declines in water levels are important, short term changes in MAU pumpage are probably important on a more local scale. When these short term stresses are repeated over a long period of time they not only influence flow directions and gradients, but also spread the VOC's in the UAU.

- Pumpage in the MAU is a factor in the 3-dimensional flow directions in the UAU. As illustrated in the GeoWest (April 1991, Figure 2) report and in the cumulative pumpage maps (Vol. I, Figures 3-27 to 3-30), SRP and COS production wells lie along the outer edge of a 4-square mile area centered on the intersection of McDowell and Hayden Roads in the southern half of NIBW; production pumpage graphs of COS 25 (GeoWest, Figure 5) and for SRP 23; 5E,5.3N (GeoWest, Figure 22) show strong fluctuations in discharge over the 5-month (winter) period. Illustrated on a less well defined level, but still indicative of transient discharge, the cumulative pumpage maps show significant spatial and temporal variations (Vol. I, Figures 3-27 and 3-30). All of these wells pump from the MAU. If MAU discharge influences UAU water levels then transient discharge should lead to transient flow patterns. Additionally, the RIFS model recognizes transient water level changes due to recharge from the Salt River Indian Reservation. These pulses weaken to the west, but they must be added to pulses due to pumping. Transient recharge/discharge stresses and the resulting flow directions have a significant impact on the dispersivity of VOC's traveling with the groundwater as has been demonstrated in a recent paper.[1]

RESPONSE:

The MARK Group's concern with hydraulic transients in the MAU affecting the UAU is contradicted by the known dampening effect of the top of the MAU. This is clearly shown in the available hydrographs for seasonal and daily water levels, particularly from the 10-day aquifer test of SRP Well 23.6E,6N.

9. EPA needs to more thoroughly examine flow patterns, water levels and TCE concentration relationships in both time and space in the UAU.

RESPONSE:

The small scale in hydrogeologic features of interest to The MARK Group is not germane to the selection of remedial action for the UAU. For the purpose of separating sources, evaluations of this type could be useful. However, this was not a specified objective of the NIBW RI/FS. However, EPA recognizes that small-scale phenomenon should be evaluated during remedial action. For future observation and management of UAU contamination, it appears that considerable additional UAU and MAU monitoring wells and monitoring will be necessary as required by the ROD.

[1]Goode, D.J. and L. F. Konikow, in press, Apparent Dispersion in Transient Groundwater Flow: Water Resources Research.

- For UAU groundwater in the NIBW area two primary factors account for distribution of VOCs: (1) surface disposal actions and migration downward to the water table, and (2) groundwater transport from up gradient sources to areas down-gradient. This second factor underscores the importance of understanding the UAU groundwater systems.

- Although EPA recognizes the southwesterly flow direction in the UAU, it should be emphasized that the pattern is widely developed across the western half of Section 1 (T1N, R4E) and that this corresponds with much of the eastern one third of the TCE plume (Vol. I, Figures 3-40).

- EPA suggests a relationship between water level rises and increases in TCE concentrations in ground-water samples from near-source wells (ST-1, M-4UA, and M-5UA in Appendix F and G). This is attributed to the presence of VOCs in the vadose zone that may be remobilized by rising water levels associated with recharge. Changes in concentrations with water level fluctuations are associated with wells in the source areas where VOCs are in the vadose zone (e.g., ST-1, M-4UA, M-5UA), but in areas where VOCs in groundwater are only a result of transport into an area from another area there is not a corresponding large change in VOC concentration.

  While ST-1 does appear to support this relationship, not all of the TCE concentration peaks in M-5UA or M-4UA correspond with water level highs. If a wider spectrum of monitoring wells is examined (e.g. M2-UA, E-5UA, M-1UA, B-J, and B-UA3) it is evident that TCE concentration increases may occur at any point in time, probably a result of several interactive factors. Near-source wells such as M5-UA or ST-1 have relatively simple TCE concentration/time curves whereas down gradient wells such as M-10UA, M-2UA, or B-J show multiple shifts in concentrations that are commonly not related to water level rises. This suggests that transient recharge/discharge conditions may cause shifts in the center of mass of the TCE plume leading to multiple rises in TCE concentrations.

- EPA notes (Vol. I, p. 3-91) that the general decline over time in TCE concentrations has not been seen at M-2UA or B-J wells. These wells are near the center of mass of a migrating TCE plume. Such wells will tend to maintain concentration levels while upgradient wells will show declines due to the recharge of uncontaminated water.

RESPONSE:
The collective causes proposed here by The MARK Group are one set of possible causes. Enhanced monitoring during remedial action will assist in evaluating small-scale processes such as those noted by The MARK Group.

o EPA states (Vol. I, p. 3-103) that the movement of the VOCs in the UAU may have been influenced by the configuration of the surface of the UAU-MAU contact (MAU ridge). EPA further states that a comparison of the TCE concentration (Vol. I, Figure 3-40) contours with contours draw on the UAU-MAU contact (Vol. I, Figure 3-10) indicates a correspondence between TCE concentrations contours and an apparent low in the UAU-MAU contact south of M-4UA and M-13UA. The trough is located to the west (e.g. western half of Section 2, T1N, R4E) and not to the south of these monitoring wells. The TCE plume spreads north-south along this trough where it corresponds with the area of thicker saturated UAU (Vol. 4, Figure J-7). The north-south concentration gradient flattens along the trough south of E-9UA, in the direction of thickening of the saturated UAU. In contrast, the north-south concentration gradient is considerably steepened and the plume is compressed across the axis of the MAU ridge. Thus, there appears to be a significant element of transverse dispersivity in the area of the trough such that the longitudinal to transverse dispersivity ratio of 10:1 used in modeling (Vol. 5, Appendix L, p. 82) may be an over simplification of this parameter.

RESPONSE:

The small scale in hydrogeologic features of interest to The MARK Group is not germane to the selection of remedial action for the UAU. For the purpose of separating sources, evaluations of this type could be useful. However, this was not a specified objective of the NIBW RI/FS.

- Dispersion, as influenced by variable hydrologic properties as well as transient stresses, must be incorporated in the TARGET model to better explain distribution of VOCs in the UAU.

RESPONSE:

The TARGET model was not developed to explain the distribution of VOCs in the UAU, but rather to evaluate potential remedial actions.

10. Most of the TCE concentration/time graphs in Appendix F are not legible because of the superposition of data points for different VOCs.

- Separate TCE concentrations/time illustrations should be made for each VOC.

RESPONSE:

Where the superposition occurs is typically around the detection limit. Generation of individual graphs is believed unnecessary in this regard for the purposes of the RI/FS.

Relevant RIFS Section(s): CHAPTER 4

APPENDIX K - VLEACH MODEL STUDY

THE PROCEDURES OUTLINED IN APPENDIX K FOR ESTIMATING THE IMPACT OF VOCS IN THE VADOSE ZONE ON GROUNDWATER USE A FLAWED METHODOLOGY FOR CALCULATING MASS CONCENTRATIONS WITHIN THE TEXTURALLY HETEROGENEOUS UAU. ASSUMPTIONS MADE IN THE VADOSE ZONE TRANSPORT MODEL (VLEACH) ARE NOT APPLICABLE TO THE VADOSE ZONE CONDITIONS AT THE NIBW AREA. EPA HAS NOT DEMONSTRATED THE VLEACH MODEL TO BE APPLICABLE TO SEDIMENTARY MATERIAL DEPOSITED IN AN ALLUVIAL ENVIRONMENT.

- Documentation for the validation and verification of the VLEACH model in alluvial environments has not been presented.
- The assumption of a continuity of concentrations within vadose layers beneath subareas (Thiessen polygons) is not supported by data from the NIBW and may invalidate calculations of mass concentrations of TCE.
- The assumed relationships between shallow soil gas, soil, and soil vapor monitoring well concentrations for determining the TCE mass in the middle cobble layer are not supported by EPA statements and are likely not valid.
- Mass concentration calculations may be biased because of the rationale used for siting the soil vapor monitoring well.
- If most concentration values are incorrect then their use in the VLEACH model invalidates the resulting estimate of impact to the groundwater.
- The VLEACH model assumes equilibrium between dissolved and gaseous phases which is not always true.
- The assumption of a homogeneous vadose zone with simple downward transport is not true and appears to invalidate the VLEACH model for evaluating vadose zone transport.
- The VLEACH model does not deal with the question of retention of TCE in fine-grained sediments and the site specific issue of the mass of TCE that cannot be removed from the vadose zone.

1. EPA has not presented documentation for validation and verification of the VLEACH model, particularly as to its applicability to alluvial sediments.

RESPONSE:

VLEACH provides consistent application of accepted processes. Its use with a reasonable range of parameters is appropriate. Until a superior model code is presented to EPA, VLEACH is the best available approach. EPA encourages improvements to the code or development of other analytical tools.

2. EPA methods for determining the mass concentration of TCE within potential source areas are technically flawed.

- TCE concentrations from soil matrix samples taken from soil borings in Area 7 and Area 8 were used to approximate the mass of TCE in the vadose zone of those potential source areas. In each area Thiessen polygons (subareas) were constructed around each soil boring, and the mass of TCE calculated for each of three layers in the vadose zone was assumed by EPA to characterize the entire subarea. This assumes a lateral continuity of concentrations within a subarea. The assumption is not supported by the distribution of shallow soil gas concentrations within polygons of Area 7 if these soil gas values are quantitative estimates of the lateral distribution of TCE.

RESPONSE:

The method utilized to estimate VOC contaminant mass in Areas 7 and 8 was a cost-effective way to use the available data. EPA acknowledges additional data could help provide a better estimate of VOC mass.

- EPA uses soil vapor concentrations to calculate mass concentrations for the middle cobble-bearing layers from which soil matrix samples could not be taken. However, EPA has stated that soil matrix concentrations, because of the loss of VOC's during sampling, are conservative values and that correlation between matrix and soil gas concentrations should be avoided (Appendix K, p. K-10 and Appendix B, p. B-7). If this is the case, then the conversion of soil gas (µg/l) to soil mass (µg/Kg) to determine the mass concentration for the coarse layer (or layers in some areas) would seem to have little meaning.

RESPONSE:

EPA states that soil matrix values are conservatively low in comparison with in situ values (shallow soil gas). Also, since soil matrix data will have a significant loss of VOCs, it is intended that VOC matrix sample data will not be used to correlate to VOC shallow soil gas data. However, this does not mean that the equation relating soil gas to soil mass is invalid, just that soil matrix data should be avoided in lieu of soil gas data.

- This problem is further compounded by the application of three different methods for calculating mass concentrations for the middle coarse layer for each subarea from the soil gas from a single soil vapor monitoring well in both Area 7 and in Area 8.

  The three methods represent an attempt by EPA to apportion the TCE concentration from a single soil vapor monitoring well throughout the entire area. The methods as described by EPA are as follows (p. K-11):

  The "uniform distribution" method assumes that soil vapor monitoring well samples from the one available well cluster in each area represent the entire area. Each subarea was therefore assumed to have the same concentration of TCE in soil vapor.

  The "shallow soil gas distribution" method apportions the soil vapor monitoring well data to other subareas based on the geometric mean of the shallow soil gas concentration of TCE in each subarea to the geometric mean of the shallow soil gas data in the subarea containing the soil vapor monitoring cluster.

  The "upper layer matrix mass distribution" method apportions the soil vapor monitoring well data to the other subareas on the estimated mass in the upper layer of each subarea relative to the subarea containing the soil vapor monitoring well cluster calculated from soil matrix data.

  If TCE sources are point sources associated with spills or leaks there is no reason to believe that the TCE will be uniformly distributed throughout any subarea of the potential source areas. Shallow soil gas distributions such as illustrated for Area 3, are in fact far from uniformly distributed. The conversion of soil gas to soil mass concentration is a problem for all three methods. The "shallow soil gas distribution" method calculates a ratio between shallow soil gas concentration based on samples of a very small volume of soil and the soil vapor concentration based on a much larger volume of soil. No direct relationship has been established between the shallow and deeper soil gas concentrations

and extension of such a ratio to the subareas is not warranted. Similar criticisms can be made of the third method ("upper layer matrix mass distribution method").

RESPONSE:

Three methods were chosen to achieve a relative idea of the mass contained in the vadose zone. This is an initial estimate of the amount of mass contained in this area. Further data will be obtained, per the requirements of the ROD, which could be used to refine these estimates.

- If the soil vapor monitoring well sited is on the basis of shallow soil gas results, then the well may represent a sample biased toward higher concentrations. This influences the results of all of the mass concentration calculations.

RESPONSE:

Additional soil vapor monitoring wells will provide additional VOC contamination data. This will give a better indication of TCE and other contaminants in the vadose zone, and therefore allow a more accurate mass estimate.

- The VLEACH model starts with these mass concentrations and attempts to estimate the impact of the VOCs in vadose zone on the groundwater. If the mass concentrations are in error the output of the model does not correctly estimate the impact.

RESPONSE:

The mass concentrations are estimates. The mass loading of TCE to the ground water is based on estimates and assumptions. To say these are in error is a matter of opinion. The VLEACH model attempts to provide one with an initial idea of the impact a certain amount of VOC contamination will have on the ground water. Additional data (at a higher cost) could alleviate some of the uncertainties associated with this process.

3. VLEACH is not an appropriate model for vadose zone transport at NIBW.

- The VLEACH model assumes that all processes and locations are an equilibrium (p. K-17). However recent publications (e.g. Cho and Jaffe,

1990)[2] show that dissolved and gas phase volatile organic compounds cannot always be assumed to be in equilibrium in the vadose environment.

RESPONSE:

For the timeframes and conditions considered here, equilibrium is a very realistic assumption.

VLEACH may be an inappropriate computer model to depict transport of contamination in alluvial materials. The model is a one dimensional finite-difference computer model in which the transport of VOC's by water filtering through the vadose zone is downward only (p. K-12). This one dimensional approach is further supported in the section headed "Processes Not Incorporated In The Model" (p. K-15). Here it is assumed that the vadose zone is composed of uniform material and that there are neither "preferential pathways" nor is there horizontal flow. However, alluvial units are inherently texturally heterogenous such that layers of varying hydraulic conductivity (i.e., horizontal and vertical) are the rule rather than the exception. MARK Group studies from lithologic and geophysical logs within the saturated portion of the UAU indicate that it is texturally heterogeneous. Soil borings from Area 3 on the south through Area 10 northward to Area 7 and 8 demonstrate that the upper 20 to 30 feet of the UAU is a heterogeneous interval composed of layers and mixtures of silt, clay, sand and gravel. Studies of the formation of lenticular caliche layers (pedogenic and non pedogenic calcium carbonate) show that in alluvial materials it is not uncommon for water infiltrating down through the vadose zone to encounter relatively impervious layers that cause the flow to move laterally until the unit lenses out and downward movement resumes. Such physical structures in alluvial materials will delay the movement of contaminants through the vadose zone.

RESPONSE:

The MARK Group does not address how the threefold vertical variation in lithology at Areas 7 and 8 was consistently addressed in applying VLEACH. At the small fluxes moving vertically at NIBW, the suggested buildups are not expected.

[2]Cho, H.J. and P. R. Jaffe, 1990, The Volatilization of Organic Compounds in Unsaturated Porous Media During Infiltration; Jour. of Contaminant Hydrology, V. 6, pp. 387-401.

- VLEACH modeling does not recognize changes in water table positions which could induce advection into or out of the polygons selected for analysis (p. K-17). Hydrographs for UAU wells (Fig. 3-12 to 3-16) show semiannual shifts from several feet to as much as 15 feet (1985). These shifts have much higher amplitudes in the eastern half of the NIBW, closer to the source(s) of recharge. The hydrographs also show a significant regional decline in static water level since monitoring began in 1983 and from historic levels extending back into the 1960's.

RESPONSE:

We disagree that cyclic variations in the water table on a seasonal or larger basis would cause significant advection in the vapor phase.

Large vertical changes in water level may carry contaminated water from an upgradient source to shallow levels in the UAU (see Area 10 comments). Some of this contaminated water then becomes stranded in the vadose zone during the succeeding period of falling water level. With the overall regional decline in water level this stranded water is never completely flushed from the vadose system. One large oscillation such as the 1985 one could have caused a significant redistribution of contaminated water in the vadose zone.

Water level maps over the last 5 years (EPA and GeoWest sources) show similar patterns, but there are shifts in the contour trends that lead to changes in flow direction (e.g., with the current lower water levels the southwesterly flow path across part of Area 12 is more pronounced). Shifts in flow direction combined with water level oscillation can redistribute VOCs in the vadose zone. The assumption that there is no horizontal redistribution of VOCs in the vadose zone between subareas is another oversimplification that may be necessary for the model, but is not valid for the actual system at NIBW.

4. EPA's VLEACH model does not deal with the issue of immobile or retained VOC bearing water in the vadose zone.

   o VLEACH does not deal with the issue of retention of VOCs in fine grained silts and clays typical of the Upper Alluvial Unit in many of the areas. Low concentrations of VOCs like TCE may be retained in silts and clays (e.g. by adsorption, fluid retention) until it degrades. Retention is related to a number of factors including texture and soil moisture such that the significance of some level of TCE concentration, in terms its potential for impacting groundwater, in a given area is a function of site-specific conditions. This question of retention is significant (e.g. if the

field capacity of a silt in an arid climate is never exceeded, downward movement does not occur).

RESPONSE:
The data sets for this, the Tucson Airport, and Phoenix-Goodyear Airport sites do not indicate selective retention of VOCs with depth in fine-grained materials of the vadose zone.

- The vadose zone contains some water. In the case of the NIBW area little is known about the degree of saturation in the UAU above the water table. It is important to recognize, as is well known in the petroleum reservoir engineering field, that there is a critical level of water saturation below which no flow can occur. The attractive forces between the grain framework and the water are stronger that the gravitational forces and no downward drainage can occur. If this retained water contains a VOC like TCE, it is likely that some TCE will be stranded in the vadose zone until it degrades. The analogous situation in the vadose zone is the concept of field capacity which is water in the micropores or capillary pores. Downward movement cannot occur unless water in excess of field capacity is added (Aguilar and Aldon, 1991)[3] by infiltration events. Experience at other Superfund sites indicates that it is not possible to removal all the VOC from groundwater. Removing all the VOC from a vadose zone is even more difficult because of the unsaturated state. The retention issue is not addressed in the VLEACH work. Note, however, if the amount of VOC is so low that most measured concentrations are below threshold volumes, as is the case in the south half of Area 3, and it is not possible to remove all of the VOC because of natural forces within the system, then the no further action alternative is the correct decision.

RESPONSE:

Our interpretation is that the soil moisture profile has adjusted over centuries to millenia to some flux entering the surface (<1 inch/year) and proceeding vertically to the water table. The specific retention was filled over these centuries to millennia--no extra space is waiting there to capture the ongoing flux. Therefore, we believe the constant advection feature of VLEACH is valid for the purposes it has been put to at NIBW.

[3]Aguilar, R. and E.F. Alden, 1991, Seasonal Water Flux and Potential For Leaching in a Semiarid Rangeland Soil; 5th National Outdoor Action Conference on Aquifer Restoration, Ground Water Monitoring and Geophysical Methods, Ground Water Management No. 5, National Water Well Association, pps. 669-683.

Relevant RIFS Section(s): CHAPTER 7

EVALUATION OF UAU GROUND-WATER EXTRACTION ALTERNATIVES

WE CONCUR WITH THE EPA ANALYSIS, SUPPORTED BY ADWR MODELING, WHICH INDICATES NO EXTRACTION (ALTERNATIVE 2) AS THE PREFERRED ALTERNATIVE FOR UAU GROUNDWATER REMEDIATION. EXTRACTION BASED ALTERNATIVES 3, 4, AND 5, TO VARYING DEGREES ARE LIKELY TO BE LOGISTICALLY COMPLEX AND COST-INEFFECTIVE, AND THEY DO NOT RECOGNIZE THE WATER QUALITY AND HYDROLOGICAL CONDITIONS THAT WILL LARGELY DETERMINE THE EFFICACY OF VOC MASS REMOVAL FROM THE UAU.

- EPA assertion that contaminated UAU groundwater results in human exposure and cannot be contained when mixed into the MAU AND UAU.

- Characterization of UAU groundwater flow direction is only partially correct in the southern portion of NIBW. Recharge sources and associated chemical masses within the NIBW are not fully addressed.

- Adoption of recharge as part of UAU groundwater remediation could worsen movement of VOC into MAU or UAU groundwater and cause remobilization of VOCs in the UAU vadose zone.

- Aside from cost effectiveness, UAU extraction and recharge alternatives present considerable logistical problems associated with wells and pipelines, in particular.

- Effectiveness of TCE removal at startup for extraction Alternatives 3, 4, 5 is considerably above the ADWR Target model estimates. EPA provides no estimate of future removal rates.

- UAU groundwater extraction is logistically complex relative to the benefits derived and fails the test of practicality.

- UAU groundwater pumping is, at best, an incomplete approach to remediation. Pumping from the MAU, beneath the saturated UAU, might be needed to capture TCE in the shallow aquifer.

- The EPA approach to UAU groundwater remediation seems to focus on water extraction and overlook the real issue of cost effective VOC mass removal.

- o The EPA analysis of UAU groundwater extraction is incomplete relative to changing UAU saturation, MAU and LAU pumping patterns, influence of projected SRPMIC water use, modified COS recharge plans, and UAU heterogeneity. EPA needs to update their analysis if extraction is seriously considered.

- o Production well abandonment or re-construction to eliminate cross flow needs to be reassessed in terms of specific wells, rationale, and cost effectiveness.

- o Speculation as to Red Unit presence and water quality is out of place.

- o The UAU groundwater monitoring program is considerably overdesigned.

1. The EPA analysis of UAU groundwater extraction as means to remediate contamination is flawed with respect to statement of the contamination problem and causes, and efficacy of the solution alternatives.

   - Collection of UAU groundwater has merit, according to EPA, because otherwise the water moving from the UAU to the MAU "cannot likely be contained because of existing hydraulic conditions" and "such collection would assist in reducing the potential for human exposure to contaminated UAU groundwater by reducing continued migration," (Vol. I, p. 7-2 para. 2). The degree to which contaminated UAU groundwater, when mixed into the MAU and LAU, "cannot likely be contained" would have to be demonstrated, which it has not, to support UAU extraction. Further, the mechanism whereby UAU groundwater results in human exposure would need to be explained before UAU groundwater remediation can be seriously considered.

RESPONSE:

The noted paragraph discusses containment within the UAU. The thin saturated thickness of the UAU does not allow extraction from it at a rate equal to or greater than existing leakage.

   - The EPA analysis does not correctly and completely assess groundwater flow direction which, in turn, is relevant to source verification and remediation. Groundwater currently flows west, northwest, and southwest (emphasis added) in the UAU contrary to what is stated on p. 7-2 (para. 4, line 6). Historically, significant recharge in terms of VOC mass appears to have entered UAU groundwater from within NIBW. Although perhaps volumetrically not significant, recharge from irrigation return flow and urban/suburban recharge resources also is occurring and

may have additional water quality implications. The EPA analysis would need to more fully address these recharge and chemical mass sources relative to the need for and means of UAU groundwater remediation.

RESPONSE:

The small scale in hydrogeologic features of interest to The MARK Group is not germane to the selection of remedial action for the UAU. For the purpose of separating sources, evaluations of this type could be useful. However, this was not a specified objective of the NIBW RI/FS. Other, as yet unidentified, sources could be impacting the contamination. EPA is not aware of VOC disposal associated with irrigation return flow and urban/ suburban recharge.

- With reference to p. 7-3 (line 1), EPA must recognize that if remedial action for UAU groundwater were adopted the program will involve more than just collection facilities.

RESPONSE:

Pages 7-3 and 7-4 address remedial action alternatives of contaminated UAU ground water. Chapters 8 and 9 address the end use of the water and the treatment alternatives.

- Adoption of an extraction alternative with recharge could worsen the movement of VOC into MAU or UAU groundwater. Given the uncertainty concerning VOC mass in the vadose zone of selected areas of NIBW, there is concern that use of recharge wells (see p. 7-3, para. 2.) might cause a remobilization of VOC's that otherwise might not be mobilized and which might naturally degrade. Accordingly, recharge is not recommended.

RESPONSE:

The largest rises in the UAU water levels will be in the immediate vicinity of the recharge wells, which were never proposed for installation in source areas.

- Concerning recharge as an end use (p. 7-15), recharge would increase water levels in the aquifer and thereby induce greater movement of contaminated water, not only toward the extraction wells, but also into the MAU, as well as increase the lateral flow toward the extraction wells.

Recharge induces additional aquifer stresses and resulting perturbations in the three dimensional flow field. These, in turn, increase the need for monitoring of water levels and chemistry. Well and pipeline installation costs and construction and operations complications in an urbanized setting also exacerbate problems associated with the extraction and recharge alternatives.

RESPONSE:

Under full operation, a recharge-extraction system would be characterized by flow which prefers lateral movement in the UAU to leakage into the MAU. Some minor increase in leakage in the immediate vicinity of the recharge wells will occur, but they would not be located in areas of contaminated UAU ground water. The potential risks of construction were noted in the RI/FS.

- Use of the IBW ponds for recharge (p. 7-3, para. 2) is not advisable given the clay liners installed specifically to reduce or eliminate seepage losses. The ponds are water conveyance and storage facilities built for aesthetic and recreational purposes.

RESPONSE:

We do not have information that the NIBW ponds have clay liners. For reasons stated in this paragraph of the RI/FS, we agree they are not appropriate for recharge.

- Whereas EPA estimates 200 to 300 pounds of TCE removal per year at startup (Vol. I, p. 7-14) no estimate of future TCE removal rates is provided. Whereas EPA concluded that pumping from the UAU at the maximum sustainable rate from within the target area may potentially remove TCE from the UAU at startup at approximately the same rate it is entering the MAU under current and assumed projected conditions, ADWR estimates that at best approximately only 25 percent of the TCE in the UAU would be removed by any of the extraction alternatives. With time, EPA expects that concentrations and mass fluxes will decrease exponentially. Accordingly, the pursuit of Alternatives 3, 4, or 5 seems to lack substantive merit in terms of technical basis. Further, the "system" rate of removal (200 to 300 pounds per year) is substantially inflated over the more ADWR estimate.

RESPONSE:

We recognize the uncertainty in estimating the mass and flux of TCE. We do not believe the removal rate over time can be reliably estimated at this time. However, given the available data, we believe the evaluation of Alternatives 3, 4, and 5 does have technical merit. Information will be collected to evaluate these options further in the future.

- UAU groundwater extraction is logistically complex relative to the benefits derived. The real lack of threat posed directly by UAU groundwater and the complexities of collection, treating, and recharging ground water to obtain a disputed quantity of TCE seems to indicate that Alternatives 3, 4, 5 simply lack the test of practicality. The cost effectiveness of TCE removal by UAU extraction is also questioned.

RESPONSE:

The professional opinion of The MARK Group is noted and serves as one possible interpretation. As required by the NCP, cost-effectiveness was considered and led to the proposed plan. Installation of further monitoring wells and continued monitoring will assist in improving our understanding of the contamination.

2. Data base inadequacies, in combination with EPA analysis shortcomings and an evolving water resource development picture in the Scottsdale area, indicate that UAU groundwater remediation is neither technically supportable, even at the conceptual design level, nor warranted given the natural processes of groundwater flow and subsequent remediation via the Scottsdale OU.

RESPONSE:

Increased monitoring, both with respect to location and frequency, would be useful for any party proceeding with a UAU extraction/recharge remedial action.

- In order to proceed with UAU groundwater remediation, EPA needs to consider the effect of changed MAU, LAU pumping patterns as mentioned in the ADWR memorandum of March 14, 1991 to the NIBW Technical Committee.

RESPONSE:

The MARK Group's concern with hydraulic transients in the MAU affecting the UAU is contradicted by the known dampening effect of the top of th MAU. This is clearly shown in the available hydrographs for seasonal and daily water levels, particularly from the 10-day aquifer test of SRP Well 23.6E,6N. The noted paragraph discusses containment within the UAU.

- The EPA analysis of UAU groundwater pumping is, in places, unclear (see p. 7-3, last sentence). Although UAU flows can be reversed by pumping, the only really effective way to remove the greatest mass from the UAU is by pumping in the upper portion of the MAU.

- There seems to be an implicit approach to UAU groundwater remediation wherein efficacy is linked to maximum saturated thickness and (water) production rate. If groundwater remediation is worthwhile it must be on the basis of cost vs. removal of VOC mass in solution. To support an extraction alternative for UAU groundwater, EPA would need to specifically consider both chemical concentration and flow rate (the latter a function largely of aquifer thickness) to develop an estimate of VOC mass removal over time.

RESPONSE:

Over the long-term, water must be present to extract. The MARK Group does not consider the placement of wells in Extraction Alternative 5 specifically to address higher mass removal potential. We recognize the uncertainty in estimating the mass and flux of TCE. We do not believe the removal rate over time can be reliably estimated at this time. However, given the available data, we believe the evaluation of Alternatives 3, 4, and 5 does have technical merit. Information will be collected to evaluate these options further in the future.

- Given the prospect of changed pumping patterns by SRP, COS, and possibly others, EPA would need to analyze the influence of these on a UAU groundwater extraction alternative. ADWR mentions these changes in the March 14, 1991 memorandum to the IBW Technical Committee but analysis via the TARGET model has not yet occurred.

RESPONSE:

Increased monitoring, both with respect to location and frequency, would be useful for any party proceeding with a UAU extraction/recharge remedial action.

- EPA used August 1989 data to evaluate the UAU groundwater extraction alternatives (see p. 7-4, para. 2). Given the amount of change both evident and suspect in the southern part of NIBW, EPA would have to re-evaluate the feasibility of any of the proposed extraction alternatives before proposing to adopt one. Changes in 1) the UAU line of saturation, 2) MAU and LAU pumping, 3) influence of projected SRPMIC irrigation and related returns flow volumes, 4) modified COS recharge plans, and 5) re-assessment of UAU heterogeneity and influence of the MAU "ridge," to name a few, would need consideration or reconsideration by EPA.

RESPONSE:

The small scale in hydrogeologic features of interest to The MARK Group is not germane to the selection of remedial action for the UAU. For the purpose of separating sources, evaluations of this type could be useful. However, this was not a specified objective of the NIBW RI/FS. We disagree that these factors affect the current decision made by EPA.

- Alternative 3, in particular, does not seem realistic given the temporal changes in UAU saturation and eastward movement of the line of saturation. Contrary to what is stated (p. 7-5, para. 4), this scenario does not facilitate "comparison of potential remedial actions," however conceptual in nature. The same is largely true for those parts of Alternative 4, where positioned west of the axis of Indian Bend Wash.

- Considering the passage of time and continued generation of data, delete "Recent" from the heading on the right column of Table 7-1, p. 7-10. Add columns showing the saturated thickness, available drawdown when pumped 100 gpm, and (VOC) mass removal at reasonable intervals, e.g., 1, 5 and 10 years.

RESPONSE:

The professional opinion of The MARK Group is noted and serves as one possible interpretation. As required by the NCP, cost-effectiveness was considered in the selection of remedies. Installation of further monitoring wells and continued monitoring will assist in improving our understanding of the contamination.

We recognize the uncertainty in estimating the mass and flux of TCE. We do not believe the removal rate over time can be reliably estimated at this time. However, given the available data, we believe the evaluation of Alternatives 3, 4, and 5 does have technical merit. Information will be collected to evaluate these options further in the future.

- Candidate production wells for remediation and the supporting reason(s) should be part of Section 7.0.

RESPONSE:

Potential actions on specified production wells are clearly described on page 7-16 of the RI/FS.

- Speculation as to Red Unit presence and water quality is out of place in a discussion of UAU groundwater contamination remediation alternatives (Vol. I, p. 7-11). This also pertains to similar conclusions in discussions of Alternatives 3, 4, 5.

RESPONSE:

The State felt strongly that discussion of the Red Unit was needed in all of these sections of the RI/FS.

- The monitoring program for Alternatives 3, 4, 5 seems grossly over-designed (Vol. I, p. 7-12). What is the technical basis for installing additional UAU and MAU monitoring wells so as to "extend the present density of UAU wells in the Motorola area to the remainder of 1 µg/l VOC's target area?" How did the Motorola density become the design norm? The cost of these UAU and MAU wells and related monitoring must be technically and economically justified, particularly in light of the monitoring program for the Scottsdale OU.

RESPONSE:

The density is based on inspection of the variability of the data from the existing network. This density is not arbitrary and may provide only the minimally acceptable capacity to observe movement within and from the UAU in critical areas. Protectiveness is the primary concern here. As the required density stands, over 1,200 feet is unmonitored between wells and this sparcity may lead to the need for additional wells. The actual locations of monitoring wells will be discussed with the NIBW Technical Committee as have all EPA-suggested installation programs. EPA maintains authority for selection of number and location of wells.

- The statement, "Projected groundwater conditions are assumed to be similar to those observed in February 1989," (Vol. I, p. 7-14) needs to be validated. At the minimum, EPA should demonstrate the degree to which the analysis presented in the RIFS represents current and projected conditions.

RESPONSE:

A demonstration of agreement between previous assumptions and future conditions is impossible. The UAU is less saturated currently than when the evaluations were made, and this reinforces EPA's observation as to reduced efficiency of potential pumping alternatives.

Relevant RIFS Section(s): CHAPTER 8

END USE ALTERNATIVES

UAU GROUNDWATER EXTRACTION AND TREATMENT WILL PRESENT SUBSTANTIAL END USE PROBLEMS.

1. Although we agree that groundwater extraction does not appear warranted at this time, if EPA were to propose groundwater extractions certain aspects of extraction treatment, and end use would require additional analysis by EPA.

   - The discussion of end use alternatives in Chapter 8 is presented as if treatment is a constant or a given. Treatment feasibility must be analyzed before or concurrent with analysis of end use. For example, the discussion of municipal end use must consider treatment as well as points of connection, pump stations, etc.

- The discussion on p. 8-5, para. 2 and 3 needs to be amplified. For example, to maintain acceptable salt levels in the IBW ponds, there must be dilution water and through-flow. Otherwise, evaporative losses would cause a salt (TDS) build-up and negate fish habitat value of the ponds. Therefore, discharge of (excess) treated water from UAU remediation could be acceptable and, in combination with withdrawal for irrigation purposes, jointly obviate the need for a recharge well field. Use of a separate pipeline to distribute treated UAU water to the north end of the wash seems highly impractical from both logistical and engineering standpoints and end use in the area near the south end of IBW would seem preferable. Recharge of surface flows into the permeable UAU south of McKellips Road would not be of benefit to Scottsdale, perhaps, but it would not be a waste of water.

RESPONSE:

The available or necessary uses of the water must be evaluated prior to evaluation of treatment methods because the use of the water dictates the level of treatment. An additional reason for evaluating end uses independent of treatment is to identify any end uses that would not require treatment. Unfortunately, all potential end users required water quality for VOCs at lower levels than in the UAU; therefore, treatment would be necessary if the ground water were extracted.

The ponds within North IBW are not in the Scottsdale urban fishery program; therefore, the concern over TDS buildup and its impact to fish habitat is not not appropriate. The text on page 8-5 states the wash system demand for water will fluctuate diurnally and seasonally; therefore, an alternate end use of the water is necessary. Sending water to the wash system continuously would cause overflow to the Salt River, which is not a beneficial use of the water and is a violation of ADWR requirements.

Relevant RIFS Section(s): CHAPTER 10

DETAILED ANALYSIS OF GROUNDWATER REMEDIAL ACTION ALTERNATIVES

THE EPA ANALYSIS OF UAU GROUNDWATER REMEDIATION, IF UNDERTAKEN, WOULD BENEFIT FROM CLOSER INTEGRATION WITH CITY OF SCOTTSDALE WATER USE PLANS AND THE SCOTTSDALE OU.

- Insistence on recharge of treated UAU groundwater because 900 gpm or less of treated water cannot conveniently be introduced to the Scottsdale municipal system seems warranted (see Vol. I, p. 10-13). The wisdom of

acquiring sites for more recharge wells, more pipelines, etc., in an area where site acquisition is so problematical is questionable.

RESPONSE:

EPA eliminated end uses other than recharge because: (1) recharge would enhance the chances for a successful UAU ground-water extraction program by providing a means of maintaining, to a somewhat greater degree than other end use options, a saturated thickness from which to withdraw water, (2) during the RI/FS local water purveyors did not express interest in accepting the water, and (3) potential complications are introduced by specifically including a particular water supply system as part of a Superfund remedy, as illustrated by the arduous Scottsdale Operable Unit remedy negotiations.

- We disagree with the thrust of paragraph 4, p. 10-14. Contamination of UAU groundwater is actually reducing with time as a result of factors unrelated to any deliberate remediation action. Further, spread of contaminants in the UAU beyond the present extent is very unlikely. The need for UAU groundwater remediation is therefore questionable.

RESPONSE:

We do not understand the comment. The commenter states disagreement with the cited paragraph from the RI/FS report, yet the points made in the comment are essentially identical to those made in the paragraph.

Relevant RIFS Section(s): APPENDIX J

ANALYSIS OF GROUND-WATER EXTRACTION ALTERNATIVES

ANALYSIS OF GROUNDWATER FLOW DIRECTIONS WOULD BE NEEDED BEFORE A UAU GROUNDWATER EXTRACTION REMEDY COULD BE IMPLEMENTED.

- o The occurrence of southwestward groundwater flow in the southern part of NIBW.
- o The significance and causes of varying UAU saturation and the use of "average" saturated thickness values.
- o Use of 1989 data and lack of validation to show that 1989 data are representative of current and projected conditions.

o Misplaced emphasis on UAU saturation, water extraction, and well hydraulics vs. maximization of VOC mass removal by selectively pumping the UAU or selected parts of the MAU.

1. The EPA analysis does not adequately address the occurrence of southwestward flow and the causes of UAU saturation reduction with time.

- The occurrence of southwestward groundwater flow in the past or as a transient condition in recent times, possibly related to pumping and (or) Salt River flows, is not included in the Appendix J discussion (see p. J-4, para. 3). This pattern is demonstrated by certain water table maps prepared by others (e.g., GeoWest Group, MARK Group) and is relevant to the transport of contaminants and remediation. Reliance on "average" water levels (Figure J-3) or only beginning (1985) and ending (1989) water levels for the period of interest is arbitrary and not fully representative of ground water flow condition responsible for contaminant migration. These conditions would have to be dealt with in any UAU extraction scheme. A similar case can be made for the assumption of the UAU saturated zone as a "relatively homogeneous hydrostatigraphic unit" (p. J-4, line 5).

- Inference is made that UAU ground water flowed northwestward as a result of Salt River flow infiltrating in the period 1978-1985 and that flows westward from 1985 onward are a result of recession of earlier water level rises (p. J-15). Although the data are limited there is historical basis for groundwater flows to the south or southwest and reversal to a west-northwest direction as a result of Salt River runoff volumes and groundwater pumping in the Scottsdale area. These facts considered, analysis of the ground water system as a basis for extraction over a period of 10 years to perhaps 30 years would need to encompass the expectant range of stresses and hydraulic responses to reduce or eliminate chances of an extraction scheme being incorrectly placed or designed relative to future stresses.

- The manner in which average saturated thickness values were derived is unclear (see p. J-15). What is the meaning of an average thickness ranging from 0 to over 100 feet in the period June 1985 to June 1989? Additional explanation of these "average" or some other statement of the point(s) being made in using these averages are needed.

- The EPA analysis would benefit from use of post February 1989 data to confirm the current and projected validity of the analysis presented. In particular, future water levels (saturation) and water quality would need to be estimated in order to select extraction alternatives that have a high likelihood of meeting future conditions. Current conditions and historical

trends suggest that current and future water levels in the UAU would be too small to support extraction as a remedial alternative for the UAU.

- Explain the significance of the statement "the saturated thickness of the UAU is often much less than the head difference between the UAU and MAU based on available measurements" as relates to whether or not leakage from UAU to MAU could be halted or reversed through pumping. Pumping from the MAU and LAU is responsible for most of the head difference between the MAU and UAU and the only way to reduce the head difference is to either stop MAU and LAU pumping or dewater the UAU. Dewatering of the UAU must be a compromise or balance of cost/practicality vs. effectiveness to remove not only water butr also more importantly, chemical mass. However, as our comments suggest, even dewatering of th UAU would leave some TCE in the UAU. Continued pumping might be required to prevent recharge from mobilizing TCE remaining in the dewaterede or vadose zones.

  We concur with EPA that UAU groundwater extraction (Alternatives 3, 4, 5) does not seem practical or effective.

RESPONSE:

Evaluation of these conditions at the small scale discussed by The MARK Group are not germane to selection of an alternative. They are germane to preliminary design, final design, and implementation. Actual implementation would require additional monitoring wells and phased implementation. For the purpose of separating sources, evaluations of this type could also be useful. However, this was not a specified objective of the NIBW RI/FS.

Future individual flow events of the Salt River below Granite Reef Dam cannot be reliably estimated. A simpler approach is warranted.

The average saturated thicknesses between 1985 and 1989 were larger in some locations (>100 feet) and smaller in other locations (0 foot).

We agree that a decrease in water levels would lead to a less efficient extraction system for the UAU, should it be attempted. Such work would be useful for any party proceeding with UAU extraction/recharge remedial action. The evaluation of more recent data does not indicate a change in the evaluation of alternatives.

The saturated thickness of the UAU is smaller than the regional drawdowns that would need to be induced in the UAU to reduce the hydraulic gradient to zero.

COMMENTS FROM
ERROL L. MONTGOMERY & ASSOCIATES, INC.

General

We have reviewed the April 1991 Public Comment Draft of the North Indian Bend Wash RI/FS Report and are pleased to note that most comments and corrections submitted by Montgomery & Associates for the June 1990 Project Committee Draft of the RI/FS Report have been addressed in the Public Comment Draft of the report. Certain previously submitted comments that were not considered are reiterated here. Additional comments specific to the April 1991 Public Comment Draft are also given.

Five general Upper Alluvium unit (UAU) remedial alternatives are presented and screened in the April 1991 Draft RI/FS. Three of the alternatives include extraction and treatment of UAU groundwater. Review of the Arizona Department of Water Resources (ADWR) modeling results for UAU given in Volume 5 of the Draft RI/FS indicates that extraction of UAU groundwater will have a negligible effect on remediation of UAU contamination. ADWR concludes that "...the proposed UAU groundwater extraction alternatives do not significantly reduce the total volume of TCE remaining in the groundwater system." The Environmental Protection Agency (EPA), in a newsletter summarizing the proposed plan for remediation of contaminated groundwater and soils in the IBW area, concludes that the "preferred alternative for shallow groundwater is to require extensive monitoring while relying upon pumping of deeper groundwater to capture the contamination." We agree with these conclusions and believe that the groundwater extraction alternatives given in the Draft RI/FS for the Upper Alluvium unit are not justified, would not be cost effective, and are not necessary to protect the public health, and therefore should not be implemented.

In addition, data for lithology, direction of groundwater movement, and distribution of volatile organic compounds (VOCs) in groundwater have been obtained from 29 additional monitor wells completed in the past year. Data from these new wells provide a more accurate and complete picture of the IBW area groundwater system. Although it would be unreasonable, given the length of time required, to suggest that these data be directly incorporated into text, tables, and maps of the April 1991 Draft RI/FS, a separate volume summarizing results from installation and testing at these monitor wells is appropriate to make this valuable information available.

RESPONSE:

Information from the recently installed wells has been considered in the selection of the UAU remedy and is available in the Administrative Record file.

Chapter 2

pg. 2-86

Paragraphs 1 and 2 - The text states that additional investigation is necessary at Motorola to determine the extent of vadose zone contamination. The installation of five or more vapor monitor wells is proposed to provide data for determining the mass of VOCs in the vadose zone and the potential impacts to groundwater.

We believe that vapor monitor wells are inappropriate for monitoring the distribution of VOCs in the soil gas in the gravels, cobbles, and boulders that comprises the UAU below a depth of between 15 to 20 feet in the vicinity of Motorola. Because of the coarse-grained composition and the very large permeability of the UAU in this area, deep vapor monitoring would monitor vagrant soil gas and would not be a good indicator of local soil contamination.

RESPONSE:

Soil vapor monitoring wells provide the most appropriate monitoring of VOC contamination in gravels, cobbles, and boulders of the vadose zone at NIBW. Soil gas data obtained from these wells will be from the well's zone of influence and are an indicator of local VOC contamination. The regional flow of soil vapor hypothesized by Montgomery Associates is not supported by the body of literature available to EPA.

In addition, we believe that concentrations of TCE detected at Motorola to date do not indicate the presence of substantial soils contamination on site. Based on recommendations contained in the June 1990 Draft RI/FS, Motorola drilled soil borings and obtained soil samples to auger refusal in Fall 1990 in the vicinity of the five EPA proposed soil vapor monitor well locations. The five soil boring locations also coincided with centers of larger concentrations of TCE detected in shallow soil gas, and would be the most likely locations to detect any soils contamination that might be present. Results from the soil boring program indicated that

TCE was not detected at four of the five soil boring locations to depths of between 13 and 18 feet. TCE was detected at a concentration of 30 µg/l in one of the soil boring locations at a depth of three feet. TCE was not detected in soil samples obtained at depths of between three and 14 feet in this soil boring.

RESPONSE:

Soil matrix sampling does not always give an accurate indication of TCE or other VOC contamination contained within a boring. Soil vapor monitoring provides data that can be utilized to give a more accurate VOC mass estimate.

Based on the questionable data anticipated from vapor monitor wells and results from several soil sampling programs that have failed to detect substantial soils contamination at Motorola, we conclude that the installation of five soil vapor monitor wells is inappropriate and unwarranted at this time. If soil vapor monitoring is required, we propose the installation of one or two soil vapor monitor wells in Area 12. Following a thorough evaluation of results, the need for further monitoring could be assessed.

RESPONSE:

Soil contamination is verified up to 5 feet in depth with shallow soil gas samples. Soil matrix samples confirmed VOC contamination at further depths in the vadose zone of Area 12. EPA acknowledges data are incomplete to evaluate VOC mass and ground-water impact. This is why soil vapor monitoring wells are required by the ROD. Based on the large area over which relatively high shallow soil gas readings have been observed, at least five soil vapor monitoring wells shall be installed to obtain the necessary information for Area 12.

Chapter 3

General

Chapter 3 of the RI/FS includes interpretations for the hydrogeologic data that provide the basis for the proposed remedial alternatives for groundwater from the Upper Alluvium unit. Review of Chapter 3 indicates errors that result in erroneous interpretations. The effectiveness of the proposed remedial alternatives for the Upper Alluvium unit is controlled chiefly by the geometry of the Upper Alluvium unit and the concentrations of TCE in groundwater in the Upper Alluvium unit. The RI/FS report contains

errors that result in over-estimation of the saturated thickness for the Upper Alluvium unit. Smaller saturated thickness results in smaller volumes of water in the UAU. In addition, declining water levels in the UAU have been documented. The overall long-term decline in water levels in the Upper Alluvium unit is critical to the proposed remediation for the Upper Alluvium unit. As water levels in the Upper Alluvium decline, potential pumping rates from proposed extraction wells would become smaller due to decreasing saturated thickness in the unit. As pumping rates decrease, the feasibility of remedial action that includes pumping groundwater from the Upper Alluvium unit would also decrease.

RESPONSE:

The supposed "errors" are a difference of opinion in interpreting uncertain geologic data. The comment is nonetheless useful in that it points out the effect uncertainty in its thickness could play in evaluating the UAU's behavior. The pumping alternatives could perform more or less efficiently than presented. Montgomery & Associates has pointed out the potential outcome of less efficiency.

Figs. 3-3 through 3-9

"Lithologic Cross Sections A-A' through G-G'" - Natural gamma logs are shown on the cross sections for wells that were included in the fluid movement investigations conducted by Motorola. We are not sure what interpretation is being derived from the gamma logs; however, because the logging operations were conducted in large diameter boreholes having various casing diameters and casing wall thicknesses, and because the annulus between the borehole wall and the casing is uncertain, we believe that interpretation of the gamma logs may be problematic.

RESPONSE:

The cross sections are unique and useful in that they provide the reader the opportunity of comparing several types of data at once. The uncertainty in interpreting gamma logs noted by Montgomery & Associates is a valid concern. Evaluation of gamma log data shown on the cross sections should recognize changes in casing wall thickness and casing direction.

pg 3-19

Paragraph 2, Lines 2 through 4 - Based on the occurrence of clay described in the lithologic log for E-9UA, we interpret the base of

UAU to be located approximately five feet above the bottom of E-9UA. Because borehole geophysical logs are not available to total drilled depth for this well, interpretation of the contact between the UAU and the MAU is problematic. As the saturated thickness of the UAU is controlled chiefly by the geometry of the base of the UAU, over-estimation of the depth to the base of the UAU in the vicinity of E-9UA would result in over-estimation of the saturated thickness. The magnitude of the saturated thickness in the UAU is critical to evaluation of the effectiveness of the proposed remedial alternatives.

RESPONSE:

Based on comparison with recent data from surrounding PA-series wells, we concur with Montgomery & Associates' interpretation at E-9UA. The 4-foot change is not significant in this deeper section of the saturated UAU.

Paragraph 2, Line 6 - Because a major part of the interpretation of the base of the UAU is based on information from the Unocal soil boring, a lithologic log of the soil boring for the Unocal vapor monitoring well should be provided in the text. Because this boring was not constructed as a monitor well and because borehole geophysical logs are not available for the boring, credibility of data from this boring is problematic.

RESPONSE:

The Unocal boring was advanced with an AP-1000 dual-wall hammer rig, which provides excellent samples for lithologic logging. The lack of borehole geophysics is regrettable, but the data from the hole were provided by geologists and are considered valid. The data have been provided to all who have requested them.

pg. 3-38

Figure 3-10, "Elevations of the Bottom of the Upper Alluvial Unit" - As the geometry of the contact between the UAU and the MAU is directly related to the determination of the volume of water available for extraction under the proposed remedial action alternatives, the reliability of data used in the interpretation of the UAU/MAU contact needs to be evaluated. In our earlier review of Figure 3-10, we indicated that major discrepancies exist in our interpretation of the elevation of the UAU/MAU contact at monitor well E-14MA and at water supply well SRP 21.5, 8N. We also

indicated a lack of confidence in the contact elevation determined from the Unocal soil boring.

RESPONSE:

Our recent reevaluation of the UAU/MAU contact indicates it is lower in elevation in the areas noted here than was indicated by the previous data set for the RI/FS report. Therefore, somewhat greater well capacity than was indicated in the RI/FS may be available for the proposed alternative.

In addition, we believe that incorporating data from the 29 monitor wells installed in the IBW area during the past year is essential to a complete and reliable interpretation of the geometry of the UAU/MAU contact. Experience from construction of many monitor wells in the IBW area indicates that the only reliable method for accurately determining the contact between the UAU and the MAU is interpretation of good quality borehole geophysical logs. Borehole geophysical logs are available for 23 of the 29 new monitor wells, and these data need to be incorporated.

RESPONSE:

Our recent evaluation of data from the 29 new monitoring wells did not provide a justification for altering the proposed plan. We agree with the usefulness of electrical and caliper geophysical logging where the UAU is saturated.

pg. 3-42

Paragraph 2 - The discussion of variations in UAU water levels in the IBW area needs to include a discussion of the overall downward trend of water levels in the UAU. Inspection of water level hydrographs for UAU monitor wells indicates that, while in some areas there is a seasonal fluctuation, the long-term water level trend for the UAU is downward, and water levels in several of the UAU monitor wells have declined below the bottom of the water level access tube. The overall long-term decline in water levels in the Upper Alluvium unit is critical to the proposed remedial action for the Upper Alluvium unit. As water levels in the Upper Alluvium unit decline, potential pumping rates from proposed extraction wells would become smaller due to decreasing saturated thickness in the unit. As pumping rates decrease, the effectiveness of extraction as a remedial alternative for the Upper Alluvium unit would also decrease.

RESPONSE:

We agree that a decrease in water levels would lead to a less efficient extraction system for the UAU, should it be attempted.

pg. 3-104

Paragraph 4, Lines 9 through 11 - The text states that "VOCs in UAU ground water in the vicinity of E-1UA, M-6UA, and M-7UA may have resulted from leakage from a 550-gallon underground waste solvent tank or leakage from a documented leak in the industrial wastewater pipe located under the main Motorola plant building." Results of laboratory chemical analyses for soil samples obtained subsequent to the release from the 550-gallon underground waste solvent tank at the Motorola facility indicated the presence of acetone, isopropyl alcohol, and trace TCA (Hargis & Montgomery, 1983). In addition, laboratory analyses of soils, after a release from the wastewater pipe located under the main Motorola plant building, showed only trace cyanide and heavy metals. No VOCs were detected from this release (Hargis & Montgomery, 1983). There is no evidence that TCE was stored in or released from the waste solvent tank. In fact, documents submitted by Motorola to EPA in 1983 establish that all TCE use was discontinued by Motorola at least one year before installation of the waste solvent tank. Therefore, the statement in the RI/FS is unfounded and should be deleted.

RESPONSE:

For the conditions found in NIBW, soil matrix sampling is not the preferred method for detecting contamination. TCA is a VOC; therefore, the noted statement still appears correct. TCE is not specified; VOCs are.

Chapter 7

General

Chapter 7 of the RI/FS includes interpretations for the hydrogeologic and hydrochemical data that provide the basis for the proposed remedial alternatives for groundwater from the Upper Alluvium unit. While the EPA has concluded in a public information newsletter that the preferred alternative for remediation of UAU groundwater is to "rely on pumping of deeper groundwater to capture the contamination", we believe it is important to comment on the analysis of extraction alternatives given in Chapter 7.

Although estimates for concentration of TCE at proposed extraction wells, summarized in Table 7-1, have been changed to reflect results from recent monitor well samples, input concentrations of TCE used for the design of the treatment facility are still substantially larger than present UAU concentrations (Chapter 9; Tables 9-1 and 9-2). Because the input concentrations for TCE are substantially larger than known concentrations of TCE in the Upper Alluvium unit, actual removal of TCE would be smaller than that predicted by the ADWR model. In addition, water level decline in the UAU has been documented and is expected to continue. As a consequence of declining water levels in the Upper Alluvium unit, it is believed that pumping rates given in the RI/FS for the proposed remedial alternatives could not be sustained. Over-estimation of input concentrations of TCE and long-term pumping rates have both resulted in over-estimation of the effectiveness of extraction as a remedial alternative.

RESPONSE:

The professional opinion of Montgomery & Associates is noted and serves as one possible outcome of remedial action.

pg. 7-4

Paragraph 4 - The text states that the Target Area for remedial action is based on a TCE concentration of one microgram per liter. The Safe Drinking Water Act MCL for TCE is five micrograms per liter. Using one microgram per liter as a Target Area results in a substantially larger area than would five micrograms per liter, and therefore a substantially larger estimate of the volume for potential remediation under Alternatives 3 through 5. The larger Target Area also has the effect of increasing the proposed number of monitor wells needed to evaluate the effectiveness of remedial activities under Alternatives 2 through 5.

RESPONSE:

Given the spacing of data points and variability of VOC sampling and analysis data for ground water in the 1 to 10 µg/l range, we do not believe the 1 µg/l and 5 µg/l contours can be reliably separated.

pg. 7-11

Paragraph 2, Lines 7 through 9 - The text indicates that implementation of extraction with recharge as an end use may result in reduced drawdown and allow for higher extraction rates. While recharge may help to dampen the effects of continued pumping

from the extraction well network, drainage from the Upper Alluvium unit to the Middle Alluvium unit is expected to continue. Water level decline in the UAU is also expected to continue, resulting in an inevitable long-term decrease in pumping rate from the extraction wells. As a consequence of declining water levels in the Upper Alluvium unit, it is believed that pumping rates given in the report for the proposed remedial alternatives could not be sustained.

RESPONSE:

We agree that a decrease in water levels would lead to a less efficient extraction system for the UAU, should it be attempted. The RI/FS indicates local dewatering even with recharge.

pg. 7-15

Paragraph 4 - Spatial coverage of the Target Area is used in the RI/FS as a means of assessing the number and location of monitor wells required to monitor the effectiveness of the proposed remedial activities. By extending the existing monitor well spacing to provide uniform coverage of the Target area, a requirement for 20 additional UAU monitor wells and 10 additional MAU monitor wells is proposed in the Draft RI/FS.

Although additional monitor wells may be useful to provide additional data on the effectiveness of the remedial system, determination of the number and location of those monitor wells based on completion of an existing grid of monitor wells is not appropriate. The number and location of required monitor wells should be determined based on available data concerning the extent and distribution of contamination and the direction of groundwater movement. The IBW Technical Committee should review and approve proposed monitor well numbers and locations before any additional monitor wells are required.

RESPONSE:

The density is based on inspection of the variability of the data from the existing network. This density is not arbitrary and may provide only the minimally acceptable capacity to observe movement within and from the UAU in critical areas. Protectiveness is the primary concern here. As the required density stands, over 1,200 feet is unmonitored between wells, and this sparcity may lead to the need for additional wells. The actual locations of monitoring wells will be discussed with the NIBW Technical Committee, as have all previous EPA-suggested installation programs. EPA maintains authority for selection of the number and location of wells.

Appendix J

General

General comments for Chapters 3 and 7 are also applicable to Appendix J. Over-estimation of the saturated thickness of the UAU has resulted in over-estimation of volume of groundwater in storage, over-estimation of volume of TCE in storage, over-estimation of potential pumping rates from extraction wells, and consequently over-estimation of the effectiveness of proposed remedial alternatives that include extraction from the UAU. In addition, over-estimation of the concentrations of TCE at extraction wells has resulted in over-estimation of the initial mass of TCE in the UAU, and consequently over-estimation of the mass of TCE removed by the proposed remedial alternatives.

RESPONSE:

The professional opinion of Montgomery & Associates is noted and serves as one possible outcome of remedial action.

Figure J-2

"Elevations of the Bottom of the Upper Alluvial Unit" - Refer to Comments for Chapter 3 for comments related to this Figure.

RESPONSE:

The supposed "errors" are a difference of opinion in interpreting uncertain geologic data. The comment is nonetheless useful in that it points out the effect uncertainty in its thickness could play in evaluating the UAU's behavior. The pumping alternatives could perform more or less efficiently than presented. Motorola has pointed out the potential outcome of less efficiency.

Figure J-3 "Average Water Level Elevations in Upper Alluvial Unit Monitoring Wells from 6/1/85 to 6/1/89" - For the CH2M Hill groundwater model, the period from 1985 to 1989 was used to represent "initial" saturated thickness conditions in the UAU. As 1985 to 1989 represents a period of declining saturated thickness, average 1985 to 1989 water level conditions substantially over-estimate saturated thickness conditions expected in the future. Predictions of the effectiveness of the UAU groundwater extraction alternatives based on the average saturated thickness from 1985 to 1989 are consequently over-optimistic.

RESPONSE:

Average UAU water levels were used as initial conditions for calibration, not for evaluation of remedial alternatives. A much lower initial set of water levels was used than is suggested by Montgomery & Associates.

Figure J-7 "Interpreted Isopach Map for Average Saturated Thickness in the UAU, 6/15/85 to 6/1/89" - As stated above, use of average water level data for the period from 1985 to 1989 to compute saturated thickness does not accurately represent or predict future conditions. The proposed extraction network needs to be designed to remediate present and future, not past, volumes and distributions of UAU contamination.

RESPONSE:

The average saturated thickness map was used to present the unique spatial distribution of saturated thickness in NIBW. It was not the basis of remediation, as suggested by Montgomery & Associates.

CORRECTIONS

General Reports prepared for Motorola by Montgomery & Associates are referenced many times in the NIBW RI/FS report. Data and/or interpretations attributed to Montgomery & Associates in the RI/FS often are not the data and/or interpretations given in the referenced report. Interpretations that are developed by CH2M Hill or EPA, from data collected by Montgomery & Associates, should be referenced appropriately. The corrections given here are related solely to incorrect references to reports prepared by Montgomery & Associates.

CHAPTER 2

pg. 2-7

Table 2-2, Area 12 - The detection limit for soil samples collected at Motorola in 1983 is given in Table 2-2 as 200,000 ug/kg. The detection limit reported by the analytical laboratory for the 1983 soil samples was actually 200 ug/kg (Hargis & Montgomery, 1983).

RESPONSE:

Table 2-2 is hereby changed to reflect this comment.

pg. 2-85

Paragraph 3, Line 10 - A detection limit of 200 mg/kg for analysis of VOCs in soil samples is given. The actual detection limit for VOCs, reported by the analytical laboratory and given in the 1983 report was 200 ug/kg (Hargis & Montgomery, 1983).

RESPONSE:

Paragraph 3, line 10, is hereby changed to reflect this comment.

CHAPTER 3

Table 3-2
pg. 3-39

Hydraulic conductivity values given in Table 3-2 do not represent hydraulic conductivity values given in the referenced report (Montgomery & Associates, 1985). Values for hydraulic conductivity interpreted by EPA from data collected by Montgomery & Associates should be referenced appropriately. Discrepancies between hydraulic conductivities given in the referenced Montgomery & Associates report and hydraulic conductivities given in Table 3-2 include values for wells M-3UA, M-5UA, M-9UA, M-11UA, ST-3, M-1MA, M-9MA, M-14MA, M-15MA, M-16MA, and M-14LA. The reason for the difference between CH2M Hill and Montgomery & Associates interpretation is not clear; however, if CH2M Hill gives their interpretation in the RI/FS it should be referenced appropriately.

RESPONSE:

The Montgomery & Associates reference is for the source of data (as referenced on the table headings), not hydraulic conductivity values. CH2M HILL analyzed the aquifer test data and believes the values given in Table 3-2 are correct based on available data and interpretations.

APPENDIX A

Table A-13 - Table A-13 indicates that dry wells located at Area 12 were 20 to 200 feet deep. Except for one deep dry well that was reportedly 200 feet deep, on-site dry wells at Motorola were 20 to 25 feet deep.

RESPONSE:

Page 1-24 of the Public Comment Draft RI/FS report reflects this comment precisely.

COMMENTS FROM SALT RIVER PROJECT

FROM ENVIRONMENTAL SERVICES DEPARTMENT:

The UAU Alternatives

EPA is familiar with SRP's role as a regional water provider in the Indian Bend Wash (IBW) area and the fact that SRP has a number of production wells in the IBW area that have been impacted by the groundwater contamination in this area. In fact, several of SRP's production wells in the IBW area produce water from UAU. As a regional water provider, SRP has a major interest in clean up of the groundwater in the North IBW area so that SRP may use all its water resources, including its groundwater resources in the North IBW area, to benefit its customers. It is from this position that SRP expresses its support of EPA's determination that a separate pump and treat program for the UAU is not appropriate.

SRP supports the Preferred Alternative EPA has proposed to be implemented for the UAU: continued monitoring of the UAU contamination without pumping of the UAU. SRP notes that the Arizona Department of Water Resources has studied this issue and determined that the total time to reach acceptable levels of volatile organic compounds (VOCs) in the UAU, and in the LAU, MAU, and UAU considered together, would be substantially the same whether or not the UAU is pumped. Since the UAU is not currently being used for drinking water, and is not expected to be needed for such use during the relevant time frame, it is not cost effective to finance a pump and treat program that would result in only nominal decreases in clean-up times.

The UAU monitoring being proposed as part of the Preferred Alternative will allow EPA to evaluate the progress of the clean up. If the monitoring shows that the UAU is not being cleaned up, a modification to the remedy may be made at that time. While monitoring of the UAU is certainly necessary, additional consideration must be given to the assumptions used in the draft report to determine the extent of such monitoring. EPA should not conclude without further study that the same density of wells as exists in other areas necessarily be extended throughout the target area.

As EPA has estimated, the cost to pump and treat the UAU could range up to $9 million more than allowing the MAU and LAU pump and treat program to clean up the UAU contamination. No additional environmental protection would result from the expenditure of these additional millions of dollars. A separate pump and treat program for the UAU could not be justified, and should not be required.

RESPONSE:

EPA believes the degree of additional monitoring included in Alternative 2 (and Alternative 48) is required to ensure adequate protection of human health and the environment whether or not there is ground-water extraction from the UAU. In fact, EPA believes the estimates provided for additional wells may represent only a minimally acceptable level of monitoring. Additional wells in the UAU and/or MAU may be necessary based upon information obtained from the initial wells.

The Soils Alternatives

SRP can understand the need to address the possibility of continued contamination of the UAU over time by the downward movement of existing vadose zone contamination. In order to accomplish the objectives of the Preferred Alternative for UAU contamination in an acceptable time period, continuing sources of contamination to the UAU may need to be removed. While SRP could support in concept EPA's recommendation to require remediation of areas with sufficient vadose zone contamination to impact the UAU, we disagree strongly with EPA's conclusions regarding Areas 9 and 5B. We also disagree with the assumptions in, and application of, the VLEACH Model that EPA plans to use to predict whether or not the UAU will be impacted by contamination found in the vadose zone. These concerns are discussed below.

Areas 9 and 5B are within the group of soils areas for which EPA has proposed additional study be undertaken. EPA has apparently concluded that for these areas (and Areas 3, 5A, 5C, 6, 11 and 12), insufficient data exists to conclude either that no further action is necessary or that soil vapor extraction is necessary.

Area 9

EPA has recommended that one soil vapor monitor well be installed at Area 9 (SRP well 22.5E-5.5N) based on EPA's conclusion that there is VOC contamination in the soils at this site. SRP has serious concerns regarding the validity of the data presented by EPA for the site. SRP has had numerous discussions with EPA regarding these concerns, and SRP's position is summarized in correspondence to EPA dated February 3, 1989, August 9, 1989, and August 20, 1990.

SRP disagrees with EPA's determination that there is significant vadose zone contamination at Area 9. SRP fails to see any need to install an expensive soil vapor monitor well at this site to acquire additional data because a correct analysis of the existing data indicates that there is no vadose zone contamination at this site. Even if the assumption were made that all the data presented in the draft report are valid, which SRP does not believe to be the case, the horizontal and vertical extent of any potential contamination has been well defined. The costs to acquire additional data

(approximately $25,000 for a soil vapor monitor well and $1500 per sampling round) cannot be justified by examination of the available data.

Specifically, during its soils investigation at Area 9, EPA reported that chloroform was detected at two sampling intervals, 0 and 5 feet beneath land surface. EPA did not report in the discussion of Area 9 the results from EPA's samples from 10, 15, and 20 feet beneath land surface from the same boring. No VOCs were detected in these 3 samples. During SRP's soil investigation of Area 9, VOCs were detected in a single sample from 10 feet beneath land surface (SRP has stated previously it believes the result to be a false positive). However, no VOCs were detected in soil samples from 5, 15, 20, and 25 feet beneath land surface from the same boring, nor in 14 samples from 3 additional borings at the site. Clearly, the horizontal and vertical extent of any potential contamination has been well defined. There is, therefore, no justification for incurring costs to collect additional data from this site. EPA has not adequately explained its rationale for recommending additional study at this site in light of the fact that previous drafts of this RI/FS recommend "No Further Study" of Area 9. SRP believes the facts support a conclusion from EPA that no further study is required for Area 9.

SRP's objections to EPA's soil data from Area 9 have been discussed at length with EPA and documented in SRP's past correspondence to EPA referenced above. To summarize, EPA failed to analyze a solvent blank for the extraction solvent used on soil samples EPA collected from Area 9, as required by the contract laboratory's standard operating procedures for GC analysis of volatiles. Results of the solvent blank analyses from samples collected the day before and the day after field work was conducted at Area 9 (June 16, 1988) indicated the extractant solvent was contaminated with methylene chloride (810 ppb and 1895 ppb from June 15 and 17, respectively), chloroform (70 ppb and 677 ppb, respectively) and carbon tetrachloride (peaks on chromatograms, but not quantified). Without a solvent blank analysis, EPA cannot validate that the chloroform EPA reported in soils from Area 9 was in the soil matrix rather than originating in the extractant solvent. In accordance with the requirements of the contract laboratory's standard operating practices, EPA's soil data from Area 9 could not have been reported. EPA has not addressed these concerns expressed by SRP. SRP remains convinced that the data upon which EPA is relying is critically flawed, thus establishing a wholly inadequate foundation for EPA's recommendations.

The fact remains, however, that even if all the data were considered valid, there is no reason to conclude that significant contamination exists which requires further study.

Area 5B

SRP's concerns regarding the validity of EPA's soils data, as expressed above for Area 9, apply to Area 5B as well. Although the data from Area 5B are somewhat different than from Area 9, in particular with respect to EPA's determination of the

vertical extent of contamination in soils, the available data still do not warrant EPA's recommendation for further study at this site.

Inconsistency of EPA's Recommendations

EPA's recommendation that Areas 9 and 5B be studied further is particularly hard to understand when looked at in connection with EPA's recommendations for other soils areas.

EPA's recommendations for Areas 9 and 5B are inconsistent with its recommendation for Area 1. In its discussion of the soil investigation conducted by ADHS at Area 1 (former City of Scottsdale (COS) sewage stabilization ponds), EPA notes that organic contaminants were detected in soil samples collected from the Area. The results are not quantified in the draft report. EPA does not describe the soil collection protocol for the ADHS investigation, but if the protocol was similar to the protocol used by ADHS at Area 3 (a protocol geared towards providing false negatives), the fact that organic compounds were detected at all in the soil samples from Area 1 is significant. It is inconsistent for EPA to recommend additional study at Areas 9 and 5B by citing the detection of organic contaminants in the soil column (which results are of suspect validity), yet to recommend no further study for Area 1 despite the fact that EPA reports the detection of organic contaminants in soils.

Moreover, it is particularly inconsistent that additional study is recommended for Areas 9 and 5B but not for the area of the COS production wells. Soil gas concentrations at the COS production wells were similar to those detected at Area 9 and, with the exception of one location, Area 5B. However, EPA followed the soil gas investigations at Areas 9 and 5B with soils investigations and follows that with a recommendation for even further study. Yet EPA recommends no further action for the COS production wells despite the fact that the only significant difference between the sites appears to be site ownership.

In view of the above comments, SRP urges EPA to modify its preferred alternative for Areas 9 and 5B to "No Further Study."

RESPONSE:

The Area 5B investigations include soil gas data collected by EPA and SRP, and soil sample data collected by EPA and SRP. Elevated 1,1-DCE concentrations were found in soil gas by both EPA and SRP. Elevated levels of TCE, PCE, and 1,1,1-TCA were found in soil by SRP in 1982. The 1,1-DCE concentration in soil gas at Area 5B is larger than the 10 µg/l level EPA has applied to soil gas at NIBW as the level where further investigation is warranted. The extent of the soil gas contamination is not known, and therefore the conclusion that the area is not a potential continuing source of ground water contamination cannot be made.

At Area 9, the soil gas concentrations were below the 10 µg/l level. However, SRP detected TCE, 1,1-DCE, and 1-1-TCA in a soil boring. SRP argues the soil boring sample yielded a false positive result; however, they have not offered sufficient data to support this point.

EPA's goal in investigating the vadose zone is to identify risks to public health from direct exposure and potential continuing sources of ground-water contamination. SRP states they understand EPA's need to accomplish this goal. At Area 5B, there is soil gas contamination, the vertical extent of which is unknown. Soil borings at Area 5B do not serve to define the extent of the soil gas contamination. In numerous instances at the NIBW site, the Phoenix-Goodyear Airport site, and the Tucson Airport site, considerable vadose zone contamination, which was present in the vapor state was not consistently detected by soil boring samples. To assess whether an area is a potential source, the mass of contaminants must be estimated. Area 5B has shallow soil gas contamination. The extent is not known, so the mass cannot be calculated. Therefore, the vertical distribution of VOC contamination in soil gas must be defined using a soil vapor monitoring well.

The reason for a soil vapor monitoring well at Area 9 is the detection of contamination in soil samples. From the EPA's perspective, there is contamination in the vadose zone of unknown extent. Therefore, the soil vapor monitoring well must be installed to define the vertical distribution of soil gas contamination.

EPA feels available information is sufficient to select no further action for Area 1.

VLEACH Model

SRP objects to certain basic assumptions made in the VLEACH Model. These objections are discussed below. SRP believes that the assumptions EPA used in the model are critical flaws in the model, resulting in an overestimation of potential impacts to groundwater from vadose zone contamination. SRP also objects to the lack of speci-

ficity for data requirements to run the model. EPA has recommended that soil vapor monitor wells be installed in several soils areas to collect additional data so the VLEACH Model can be applied. EPA does not, however, define what the data requirements are to run the VLEACH Model, so reviewers cannot make an adequate evaluation of EPA's recommendation to collect additional data.

SRP further objects to the assumption that groundwater is impervious to gaseous diffusion. The application of this assumption, that ground water is a sink for, and not a source of, VOCs overestimates the potential VOC loading to groundwater. Application of this assumption is also inconsistent with conclusions EPA makes within the body of the draft report (e.g., source of VOCs in deep soil gas samples, Area 10). SRP recommends that gaseous diffusion be incorporated as a fundamental element of VLEACH applications.

SRP demonstrated (February 3, 1989) that VOCs volatilizing from the underlying groundwater was a reasonable explanation for the observed soil gas concentrations at Areas 9 and 5B. Other researchers have reported (Devitt et al, 1987) that diffusion via concentration gradients is the mechanism of greatest importance for vapor phase VOC transport in the vadose zone. SRP is not proposing that VOCs cannot migrate downward through the vadose zone, particularly in areas with known surface sources of VOCs. SRP contends, however, that VOCs do volatilize from groundwater and migrate upwards to the surface via diffusion and that this is what is occurring at Areas 9 and 5B. If the VOCs in the vadose zone originated from the UAU, and are migrating towards the surface, then these VOCs present no danger to continued contamination of the UAU. SRP is concerned that EPA's failure to consider this phenomena would incorrectly lead EPA to conclude that all VOCs found in soil gas resulted from surface contamination moving downwards. EPA would then likely find that remediation of the vadose zone is required.

SRP also objects to the assumption that there is no degradation of VOCs in the vadose zone. This assumption is not supported by physical evidence (the presence of DCE) and it is inconsistent with conclusions that EPA makes within the body of the report (that DCE is a degradation product of PCE/TCE). Degradation will, over time, reduce the VOC mass in the vadose zone, lessening the potential loading to groundwater. Additionally, the degradation products have differing physical characteristics (e.g., density changes) that affect the transport mechanisms (diffusion and gravity). SRP recommends that degradation processes be incorporated into VLEACH applications.

Finally, SRP objects to the fact that evaporation of infiltrating water is not accounted for, resulting in an overestimation of liquid advection. The omission of evaporation also results in an overestimation of soil moisture content which would affect the sorption/desorption process - sorption of VOCs to soils particles is increased in dry soils. SRP recommends that evaporation of infiltrating liquids be incorporated into VLEACH applications.

RESPONSE:

SRP will note that results of model operation with and without gaseous diffusion from the water table are provided in the RI/FS. Contrary to SRP's assertions, VLEACH presently can incorporate gaseous diffusion if the operator can estimate what the ground-water concentrations will be over the timeframes of hundreds of years. SRP's assertion that diffusion from the water table is the mechanism of greatest importance for VOC transport in the vadose zone is based on a statement considering shallow vadose zones without extensive internal contamination, and therefore is not appropriate for discussions of continued migration of soil contamination at NIBW.

Assuming a residence time of 20 to 30 years at NIBW, VOC diffusion from the water table has only had a chance to have a significant impact reaching a few tens of feet above the water table at most. SRP's contention that current shallow soil gas concentrations are due to diffusion from the water table is clearly contradicted by a specific study of this phenomenon at NIBW. Montgomery & Associates measured shallow soil gas conentrations adjacent to UAU monitoring wells in September 1986. No correlation was found between a wide range of shallow soil gas concentrations and a wide range of water table concentrations. In light of these facts, EPA disagrees with SRP's contention that the operation of VLEACH and interpretations found in the RI/FS are contradictory.

Biodegradation is possible, but cannot be quantified reliably at this time. Therefore, its rate of action cannot be relied upon to protect the ground water. If the in situ bioreaction rates for soils at NIBW are reliably quantified, they could be added to VLEACH or any equivalent model SRP may want to develop.

Contrary to SRP's assertion, evaporation above the extinction depth is accounted for in the total advection rate.

FROM ENVIRONMENTAL MANAGEMENT SERVICES DEPARTMENT:

EPA FINDINGS: SRP WELL SITE 23.6E-6N

Salt River Project disagrees with EPA's findings at SRP well site 23.6E-6N. In the draft report, EPA states that the well site is a suspect source area because VOCs were found to be present in lubrication oil floating in the well. EPA subsequently relied upon the results of EPA soil-gas and soil sampling investigations at the well site to recommend additional studies be conducted at the site. SRP believes, however, that EPA's conclusions, and the data EPA relied upon to make those recommendations, are erroneous.

Lubrication Oil:

The issue of VOCs in floating lubrication oil is further addressed below in this letter. Consideration of all the evidence, however, leads to the conclusion that the presence of VOCs in the floating oil is the natural end result of the VOCs partitioning out of contaminated groundwater and into the oil. SRP did not conduct any maintenance activities at the well site that would have contributed VOCs to the lubrication oil. EPA has unjustifiably considered the well site as a suspect source area based on misleading VOC data from the floating lubrication oil.

Soil-Gas Data:

In the description of the soil-gas investigations on page 2-2 of the draft report, EPA reports that the soil-gas data from the second round of investigations contains erroneously high readings for DCE. EPA reports that during the course of the second round of soil-gas investigations conducted at Area 6, independent laboratory analysis of soil gas data failed to detect DCE in soil gas samples at the high levels reported by EPA. Based on the results of the independent laboratory confirmation testing, and limitations on the analytical procedure used, EPA concludes that EPA's soil-gas data for DCE are not reliable.

EPA's conclusion that additional vadose zone investigation is necessary at the SRP well site hinges upon a single high reading of DCE that was collected at the well site in suspect second round of soil-gas investigations. SRP requests that EPA re-evaluate the soil-gas data from the SRP well site, bearing in mind EPA's conclusion that DCE soil-gas concentrations are prone to error. SRP believes that, based on EPA's conclusion that soil-gas DCE data are unreliable, EPA's soil-gas data cannot be used to justify additional vadose zone investigation at the well site.

Soil-gas investigations are useful as a limited exploratory tool, but are not reliable for source area characterizations. As reported in the Gradient report, prepared by SRP and the Gradient Corporation and submitted to EPA on February 3, 1989, the concentrations of VOCs detected in EPA's and SRP's additional soil-gas investigations at the well site are consistent with the levels expected for an area that is underlain by contaminated groundwater. Gaseous diffusion upwards from the contaminated UAU groundwater is responsible for the observed levels of VOCs in the soil-gas at the well site. Elevated levels of DCE, with respect to other VOCs present, are expected based on the historical occurrence of cascading water within the well and the increased volatility (i.e larger Henry's constant) of DCE. Elevated levels of DCE can also be expected due to the analytical limitations reported by EPA in the draft report. The Gradient report contains a detailed discussion and evaluation of EPA's and SRP's soil-gas data. SRP requests that EPA further evaluate the data and discussion in the Gradient report.

Soils Data:

EPA also reported soils data EPA collected from the SRP well site 23.6E-6N. EPA did not, however, include SRP's soils data or the evaluation of the validity of EPA's soil data that are contained in the Gradient report. As detailed in the Gradient report, there are critical deficiencies in the QA/QC for EPA's soil data at SRP well site 23.6E-6N. EPA reports that a field solvent extraction was performed on soil samples collected in the soils investigation. In the draft report EPA does not describe in detail the protocol by which this field extraction was to be performed. In the evaluation contained in the Gradient report, however, it is evident that EPA's protocol established a requirement that a solvent blank analysis be performed on the extractant solvent used in soil samples collected at each sampling area.

A solvent blank analysis is critical in the validation of the soils data so that it is possible to differentiate contaminants that are introduced to the sample as impurities in the extractant solvent and those that were present in the soil matrix. EPA did not collect or analyze a solvent blank for the extractant solvent used at SRP well site 23.6E, 6N. The contaminants reportedly detected in the soil samples from the SRP well site are common impurities in laboratories and solvents. Without the critical solvent blank analysis, EPA cannot confirm that the reported results are indicative of the soils matrix rather than the extractant solvent.

As detailed in the Gradient report, SRP performed additional investigations at the well site. Soil samples were collected at the same depth intervals and locations as the EPA soil samples. SRP also collected additional soil samples across the well site. None of the soil samples collected at the well site during SRP's soil investigation had detectable levels of VOCs. SRP concludes, therefore, that there are no VOCs in the soils at SRP well site 23.6E-6N and that the results reported by EPA are false positives, error introduced by the extractant solvent.

What is troubling to SRP is that EPA, in its evaluation of the SRP well sites, did not consider all the information that was available to it, particularly the data and discussions contained in the Gradient report. The draft RI/FS report does reference, and include some soil-gas data from, the Gradient report. EPA did not include, however, any of Gradient's evaluation of the soil-gas data, the results of the SRP soil sampling investigation, or the evaluation of the validity of EPA's soil sampling results. SRP requests that EPA consider all the data and evaluations developed in the Gradient report.

Upon careful consideration of all the data available for the SRP well sites, the only conclusions that can be drawn are that SRP is not a responsible party in the IBW site, that there is no evidence to suggest that well sites are source areas, and that no additional work is warranted at either SRP well site.

RESPONSE:

SRP has not provided the testing results to support its contention that concentrations of over 10 mg/l of VOCs in oil are in equilibrium with less than 100 µg/l of VOCs in ground water within the wells at NIBW.

The solvent blank analysis is useful, but not critical to the evaluation discussed here. EPA disagrees with the repercussions suggested by SRP.

SRP did, in fact, detect contamination during its soil sampling programs at Well 23.6E,6N--TCA, TCE, and PCE were found throughout the soil profile in 1982.

The Area 5B investigations include soil gas data collected by EPA and SRP, and soil sample data collected by EPA and SRP. Elevated 1,1-DCE concentrations were found in soil gas by both EPA and SRP. The 1,1-DCE concentration in soil gas is larger than the 10 µg/l level EPA has applied to soil at NIBW gas as the level where further investigation is warranted. The extent of the soil gas contamination is not known, and therefore the conclusion that the area is not a potential continuing source of ground water contamination cannot be made.

At Area 9, the soil gas concentrations were below the 10 µg/l level. However, SRP detected TCE, 1,1-DCE, and 1-1-TCA in a soil boring. SRP argues the soil boring sample yielded a false positive result; however, they have not offered sufficient data to support this point.

EPA's goal in investigating the vadose zone is to identify risks to public health from direct exposure and potential continuing sources of ground-water contamination. SRP states they understand EPA's need to accomplish this goal. At Area 5B, there is soil gas contamination, the vertical extent of which is unknown. Soil borings at Area 5B do not serve to define the extent of the soil gas contamination. In numerous instances at the NIBW site, the Phoenix-Goodyear Airport site, and the Tucson Airport site, considerable vadose zone contamination which was present in the vapor state was not detected by soil boring samples. To assess whether an area is a potential source, the mass of contaminants must be estimated. Area 5B has shallow soil gas contamination. The extent is not known, so the mass cannot be calculated. Therefore the vertical distribution of soil gas must be defined using a soil vapor monitoring well.

The reason for a soil vapor monitoring well at Area 9 is the detection of contamination in soil samples. From the EPA's perspective, there is contamination in the vadose zone of unknown extent. Therefore, the soil vapor monitoring well must be installed to define the vertical distribution of soil gas contamination.

PRODUCTION WELL SEALING

Salt River Project disagrees with EPA's recommendations that several SRP production wells in the IBW area be modified or decommissioned. For EPA to conclude that there may be vertical migration of fluids outside the well casing solely on the basis of the well installation method employed suggests that EPA may be proceeding under some misconceptions of the processes, and the relevant merits, of cable tool drilling.

Cable tool well installation in unconsolidated materials essentially consists of drilling an undersized hole and driving an oversized casing to depth. The casing, equipped with a drive shoe only a fraction of an inch larger than its outside diameter, is advanced as the borehole is advanced to depth. The unconsolidated sediments of the UAU would readily collapse against the outside of the well casing, thus, there would be no continuous annular space through which fluids would migrate. Vertical migration along the well casing would be similar to the vertical migration within the aquifer materials themselves. Similarly, the clays of the MAU would collapse or swell against the casing sealing off the MAU. It is speculative for EPA to conclude that there is enhanced vertical migration from the UAU to lower units along the outside of the well casing. EPA has installed, by mud rotary methods, monitor wells in the IBW area with "a natural gravel pack" indicating that EPA is familiar, and indeed comfortable, with the process of formation sediments collapsing against monitor well casings. The sediments of the UAU would more readily collapse against the casing of wells installed by cable tool method than wells installed by mud rotary due to the smaller annular space created during drilling and the absence of drilling fluids in cable tool drilling. EPA's experience suggests that it would recognize that the sediments of the UAU would collapse against the outside of the well casing and that there is no significant risk that fluids would migrate through openings along the well casing. SRP believes that there is no justification for modifying or abandoning its production wells in the IBW area based on the drilling technique used to install the well.

Salt River Project, as a regional water provider, must be concerned with future water quality, water management and water supply issues. Salt River Project has, and retains, rights to pump groundwater in the Indian Bend Wash area. SRP must look beyond present circumstances in which groundwater contamination in the area has impacted SRP wells and SRP's rights in the area to pump groundwater. SRP must look to the future when the planned remediation of the IBW area has progressed to the point that SRP will be able to utilize its groundwater rights in the area to best manage water resources to meet ever increasing regional water demands. For SRP to abandon its groundwater rights, or its investment in production wells, in the Indian Bend Wash area would be shortsighted and not in the best interest of the welfare of the community.

RESPONSE:

SRP's confidence in the cable tool method's sealing of the borehole is not shared by EPA. It is apparently not shared by ADWR, as they require grouting of a minimum 1-1/2-inch annulus around the outside of casings. In cable-tool drilling, the drive shoe is larger than the casing, and the even swelling of the sandy silts-clays of the MAU cannot be relied upon or conclusively tested for integrity once the casing is in. Experience from logging and sampling of similar wells at the Phoenix-Goodyear Airport Superfund site indicated that significant movement of contamination occurs outside of cable tool casings under vertical hydraulic gradients much smaller than at NIBW.

SRP's reference to EPA monitoring wells with natural packs is irrelevant considering that those intervals are typically short (less than 70 feet), within one hydrostratigraphic unit, and located below grout-sealed intervals. Formation collapse is not relied upon, nor even needed in the slotted intervals of the EPA monitoring wells to restrict vertical movement. By contrast, the production wells of concern have no grout seals outside of casings 500 to 1,200 feet long which cross hundreds of feet of the MAU.

Modifications to existing wells are not included in the selected UAU remedy. In fact, the selected UAU remedy relies upon continued conduit-aided migration.

LUBRICATING OIL REMOVAL

Salt River Project disagrees with EPA's recommendations that lubricating oil be removed from production wells on a semi-annual basis. SRP has provided data to EPA previously that demonstrates that there are no VOCs in the lubricating oil in its unused state. Neither are there any well maintenance practices employed at the well sites that would introduce VOCs into the lubricating oil. Any VOCs that may be present in the oil would be a result of the VOCs partitioning out of the regionally contaminated groundwater and into the oil.

SRP conducted an evaluation of its present and historical well site practices and determined that chlorinated solvents were not used at SRP well sites. In fact, major pump and well maintenance activities are not conducted at the well site because there are no facilities nor the available space at the site to perform such activities. Major pump and well maintenance activities are performed off site. Some minor amounts, less than a pint, of a petroleum hydrocarbon based cleaner were used in the past on an irregular basis to clean the outside of the pumping plant on the surface; all residual product would evaporate during the course of the cleaning activities. Even accidental spills, if they had occurred, of such small amounts would not have had any impact on groundwater. SRP also provided data to EPA in a letter dated August 15, 1988, that

indicated that the lubricating oils used in SRP production wells did not contain chlorinated solvents. The solvents were, and are, highly refined petroleum products (e.g. mineral oil) that do not contain solvents in the natural or refined state. In fact, for the oils to contain solvents would be contrary to the intended use of the product, lubrication.

In an effort to resolve the issue of VOCs in the floating lubrication oil, SRP is conducting laboratory experiments to demonstrate the partitioning of TCE between water and oil. The results will be provided to EPA in SRP's upcoming meeting with EPA, August 31. The experiments are expected to demonstrate that TCE will partition from contaminated water into oil and that the magnitudes of VOC concentrations present in oil will be elevated with respect to the original concentration in water as a result of VOC partitioning from a large volume of water into a small volume of oil. Preliminary results of the laboratory experiments confirm this hypothesis. The preliminary results also confirm that TCE is miscible in oil as previously maintained by SRP. These results support SRP's position that the elevated levels of VOCs detected in floating lubrication oil are a result of partitioning from the regionally contaminated groundwater.

It is SRP's standard operating practice to remove lubricating oil from its production wells during routine maintenance cycles. In order to remove the oil, the well must be taken out of service while the pump and all down-hole equipment are removed. The oil is removed, tested for total halide concentrations in accordance with EPA requirements and protocols, and handled accordingly. The whole process is time consuming and expensive. It is SRP's belief that removing the oil during its routine maintenance cycle is sufficient to allay any potential environmental concerns and there is no justification to remove the oil on an expedited schedule. To go through the oil removal process on a 6-month cycle would severely impact the ability of SRP or the City of Scottsdale to produce groundwater in the area, altering the groundwater remediation program that will be implemented in the IBW area.

RESPONSE:

SRP, in fact, did not provide the results at the August 31, 1990, meeting or since, to EPA's knowledge. Assuming appropriate scientific methods were used, partitioning measurements using oil and ground water from the actual wells would be very useful in evaluating SRP's contentions. As it stands, EPA has not received information which would change the statements made in the RI/FS concerning floating oil and VOCs.

EPA agrees that removal of floating oil could be effectively conducted during SRP's and Scottsdale's standard pump maintenance activities--approximately every 3 to 5 years.

END USE ALTERNATIVES

While SRP does not concur with EPA's assessment that groundwater extraction is necessary to address contamination in the UAU, SRP must still be concerned with the EPA's evaluation regarding end use of any treated groundwater. SRP believes that EPA prematurely dismissed the agricultural end use alternative without adequate consideration.

SRP is entitled to produce groundwater in the IBW area, yet SRP's groundwater rights have been impacted by the contamination in the area. This restriction has adversely impacted SRP's ability to effectively manage its water resources for the maximum benefit of all its customers, especially in times of limited availability of surface water resources such as we currently are experiencing. SRP is a regional water provider, and impacts to SRP's operations in one area necessarily impact SRP's operations in other areas. The groundwater contamination in the IBW area, and the limits it imposes on groundwater production, strains SRP's ability to manage available supplies for the demand throughout the Phoenix metropolitan area. SRP requests that EPA reconsider the SRP transmission system as an end use alternative. SRP has as much right to produce groundwater in the IBW area as does the City of Scottsdale. Further, by implementing a well head treatment option, and discharging the treated water into the existing SRP system in the Indian Bend Wash, there would be no need for the extensive capital expenditures required to connect with a municipal system. The remediation, therefore, would be more cost effective, a factor EPA must consider in the RI/FS process. Finally, by implementing a well head treatment option, EPA would have the greatest amount of flexibility in operating a groundwater extraction system if one is eventually required. Since a treatment plant is designed to inflow capacity and influent VOC concentrations, if EPA relies on a central treatment plant and removes extraction wells from the extraction network over time, EPA runs the risk of having a plant that is poorly designed for operating conditions.

RESPONSE:

SRP's comment is inconsistent with two contacts made by CH2M HILL with SRP, once in 1986 and again in 1989 during preparation of the RI/FS, in which SRP indicated only the difficulties associated with such a delivery if it were to be interested at a later date. Assuming that SRP has changed its interest in the remedial action water, EPA's experience (with Scottsdale OU negotiations and at the Phoenix-Goodyear Airport) with end uses other than recharge indicates that the operational, contractual, and institutional challenges are substantial.

RESPONSE (Continued):

Reanalysis of the efficacy of wellhead treatment versus central plant treatment by CH2M HILL confirms the approach used for development of alternatives for the RI/FS. Wellhead treatment of several wells in this situation is not as efficient as central treatment. This inefficiency was large enough that it precluded the development of a formal alternative for evaluation. Wellhead treatment may be more practicable if fewer extraction wells were utilized.

SPECIFIC COMMENTS ON NORTH INDIAN BEND WASH REMEDIAL INVESTIGATION/ FEASIBILITY STUDY PROJECT COMMITTEE DRAFT JUNE 1990

CHAPTER 1: INTRODUCTION

Pages 1-11 to 1-15: Table 1-1, the chronology of Events at Indian Bend Wash, does not identify the soil-gas and soil investigations conducted by SRP and the Gradient Corporation in 1988/1989. Yet, EPA makes partial reference to these results in its evaluation of each of the areas in chapter 2 of the report. SRP requests that EPA identify the SRP studies in its chronology and, as discussed in comments regarding chapter 2, consider all the data generated by these studies.

RESPONSE:

Page 1-15, Table 1 in the Public Comment Draft lists SRP and Gradient soil and soil gas sampling at 23.6E,6N and 22.5E,5N.

Page 1-16: EPA refers to soil-gas sampling conducted by SRP and Gradient Corporation but does not reference the soil sampling that was conducted and reported to EPA in the Gradient report. SRP requests that EPA consider all data, evaluations, and conclusions in the Gradient Corporation report that were presented to EPA.

RESPONSE:

Page 1-16, paragraph 5, sentence 3 in the Public Comment Draft references soil and soil gas samples taken by Gradient Corporation and SRP in 1988 and presented in 1989. EPA did consider all data made available to it in drawing conclusions.

Page 1-21: EPA refers to soil analyses data that were collected from Area 1, the Scottsdale Wastewater Treatment facility, but indicates that the data has not been obtained. SRP requests that EPA obtain the soils data from Area 1, as the only soils data representative of that location, and make the data available for review.

RESPONSE:

EPA cannot locate soil data collected by ADHS from Area 1. EPA feels available information is sufficient to select no further action for Area 1. The historical operations were reviewed, and the areal coverage of soil gas is believed to be sufficient to evaluate the potential occurrence of vadose zone contamination.

Page 1-22: EPA states that Area 5B, SRP well site 23.6E,6N, was identified as a suspected source area because oil containing VOCs were found in the well. SRP disagrees with EPA's conclusions that the VOCs in the oil may have been the result of pump cleaning and maintenance activities. As discussed in the Gradient report, there were no maintenance activities conducted at the well site that could have contributed the observed VOCs to the lubrication oil. Major pump and well maintenance activities were performed off site due to the limited space and facilities at a well site. SRP contends that the VOCs found in the floating lubricating oil in the Montgomery investigations are the result of partitioning from contaminated groundwater that has migrated to the SRP well location from sources off site. SRP refers EPA to its off-site migration policy that states that the presence of contaminated groundwater beneath a facility does not, of itself, indicate the facility is a source.

RESPONSE:

SRP, in fact, did not provide the results at the August 31, 1990, meeting or since, to EPA's knowledge. Assuming appropriate scientific methods were used, partitioning measurements using oil and ground water from the actual wells would be very useful in evaluating SRP's contentions. As it stands, EPA has not received information which would change the statements made in the RI/FS concerning floating oil and VOCs.

CHAPTER 2: VADOSE ZONE

Page 2-2. paragraph 1. EPA does not reference the additional work conducted at the SRP well sites and detailed in the Gradient report.

RESPONSE:

EPA apologizes for omitting reference to work by SRP on page 2-2. Reference is made to this work in numerous other locations in the report, and most importantly, EPA considered the Gradient report in its evaluations and decisions.

Page 2-2. Paragraph 3. EPA reports that 1,1-DCE data, from second round soil-gas investigations, may be erroneously high. This report is significant in that a single high value DCE is reported as the soil-gas constituent of concern in Area 5B, the SRP Granite Reef well site (SRP well 23.6E,6N). SRP requests that EPA reconsider its evaluation of the soil-gas results from SRP well site 23.6E,6N in light of its conclusion regarding DCE soil-gas data reliability.

RESPONSE:

EPA sees SRP's values of 1,1-DCE at 82 µg/l as confirmation that 1,1-DCE exists at levels greater than 10 µg/l, the value at which VOC contamination requires further investigation in NIBW. See page 2-39, paragraphs 2 and 3 of the Public Comment Draft RI/FS report.

Page 2-3. Paragraph 6. EPA does not reference the additional soil sampling work conducted at the SRP well sites and reported in the Gradient report. Additionally, EPA reports that it employed a different soil sampling technique than the other parties, including SRP, employed. EPA does not, however, include a detailed description of the field extraction technique it employed. While EPA reports that the field extraction technique EPA used, a solvent extraction procedure, would reduce the potential for false negatives; SRP contends that without adequate QA/QC data for the solvent, the EPA data is prone to false positives. As reported in the Gradient report, the QA/QC EPA employed for this technique is critically deficient for samples collected at SRP well sites. EPA did not collect and analyze a solvent blank for the extractant solvent used in the field at the SRP well sites. EPA cannot, therefore, verify if the reported contaminants were present in the soil matrix or if they were introduced to the sample in the extractant solvent. SRP believes that EPA's soil sampling data reported for the SRP well site are false positives.

RESPONSE:

EPA did not reference the Gradient report in that particular paragraph, but the report is referenced in other parts of the RI/FS and has been used in EPA's interpretations and decisions. The EPA methods for soil sampling are presented on the Field Sampling Plan, 1987, and the Soils Investigation Technical Memorandum, 1988. Both documents were provided to the technical committee and are in the Administration Record.

Page 2-13: SRP requests that EPA obtain, and make available, the soils data from Area 1. This is of particular concern in that EPA reports that there were positive identifications of organic compounds, and yet EPA concludes there is no significant concentration of residual VOCs at the site. Without additional information, it appears that EPA has evaluated the potential impacts from facilities located in Area 1 differently than it evaluated the areas with SRP well sites.

RESPONSE:

EPA will continue its attempts to obtain the 1983 ADHS data for Area 1. SRP will be provided the data when obtained. The historical operations were reviewed, and the areal coverage of soil gas is believed to be sufficient to evaluate the potential occurrence of vadose zone contamination.

Page 2-35: Paragraph 3. SRP believes that the presence of VOCs in the lubrication oil is the result of partitioning out of the regionally contaminated groundwater and is not cause for considering the SRP well site a potential source area. SRP requests that EPA either delete this statement or condition it with language that indicates that the VOCs were present in the oil as a result of partitioning from the regionally contaminated groundwater as was done for discussion regarding the City of Scottsdale well locations. Without further information, SRP must conclude that EPA is treating the City differently than it is treating SRP, although the facts concerning well maintenance practices and the presence of VOCs in lubricating oil at SRP well sites and other locations are not different.

RESPONSE:

Page 2-30 contains reference to the possibility of VOC partitioning from contaminated ground water to the oil in the well casing. Reference is also made to the Gradient report. Statements made on page 2-30 regarding the oil in well 23.6E, 6N and on page 2-86 regarding the COS wells are identical. EPA is not treating the City differently. The highest levels of VOCs detected in oil from the City's wells were signficantly below the the highest levels of VOCs detected in oil from SRP Well 23.6E,6N and SRP Well 22.5E,5N.

Page 2-35, Paragraph 4: EPA reports that elevated levels of DCE, and other VOCs, were detected at the SRP well site. On Page 2-2, however, EPA reports that elevated levels of DCE were erroneously detected in the soil-gas investigations. SRP requests that EPA qualify the data reported in this paragraph with the statement regarding the analytical error EPA previously acknowledges.

RESPONSE:

EPA wishes to correct the comment. Page 2-2 raises the possibility of erroneously high soil gas values for DCE at Area 6. There is an equally high possibility the variance between the field soil gas result, and the offsite lab result could be due to the sample collection or offsite lab. Furthermore, SRP confirmed the presence of elevated DCE concentrations in soil gas in their 1988 investigation. SRP detected 82 µg/l of 1,1-DCE near the location of the 210 µg/l sample collected by EPA.

Page 2-41, Paragraph 5: SRP requests that EPA include the evaluation of EPA soils data validity, as referenced in the Gradient report, similar to EPA's inclusion of SRP's additional soil-gas data. The Gradient report concludes that EPA soils data cannot be considered valid as EPA failed to perform the necessary, and required, QA/QC on the field extractant solvent used on the soil samples. The compounds reported to be in the soil samples are common impurities in the type of solvent EPA used in the extraction process. Failure to perform a solvent blank analysis precludes EPA from determining if the contaminants originated in the soils or in the extractant solvent.

RESPONSE:

EPA disagrees with the repercussions of the solvent blank analysis suggested here by SRP.

Page 2-41: SRP again requests that EPA consider all available data in its evaluation of the well site, including the results of SRP's soils investigation that are contained in the Gradient report. Those results indicate that no detectable levels of VOCs are contained in the soils at the SRP well site.

RESPONSE:

EPA has considered all of the data made available to it and concludes that SRP's statement in this comment is not correct.

Page 2-42, Paragraph 1: SRP disagrees with EPA's conclusion that there is vadose zone contamination at SRP well site 23.6E-6N. SRP contends that the data EPA relied on to draw this conclusion are erroneous. By its own admission, EPA reports that DCE levels for the soil-gas investigation are erroneously high. SRP also contends that EPA's soils data are invalid. SRP's investigations at the well site, not fully referenced in the draft report, indicate that the soil-gas concentrations of VOCs detected at the well site are consistent with the levels expected for an area underlain by contaminated groundwater. (SRP refers EPA to its off-site migration policy that states that the presence of contaminated groundwater beneath a facility, of itself, does not indicate the facility is a source.) SRP's investigation also indicates that there are no detectable levels of VOCs in the soils at the well site. SRP concludes that there are no significant levels of VOCs in the vadose zone at the well site and that no further investigation of the site is warranted.

RESPONSE:

EPA has stated the DCE levels in soil gas at Area 6 must be confirmed. This statement at Well 23.6E, 6N is not an issue because SRP confirmed the presence of DCE in soil gas in their 1988 investigation. SRP also detected TCE and other VOCs in a soil sample at Area 5C. Previous responses have addressed the reasons further investigation is necessary.

Page 2-42, Paragraph 3: SRP recommends that, in its further evaluation of Area 5C, EPA concentrate some of its efforts on the automotive repair facility that has been located on site for a number of years in addition to investigations around the monitor well locations at site 5C.

RESPONSE:

EPA will consider all appropriate information prior to initiating enforcement actions.

Page 2-43, Paragraph 3: SRP notes that EPA questions the validity of its soil-gas data for DCE at Area 6. This corresponds to EPA's conclusion on Page 2-2 regarding the potential for erroneous DCE readings in the soil-gas investigations. SRP requests that EPA reconsider the soil-gas data from Area 5B with this conclusion in mind.

RESPONSE:

SRP detected 82 µg/l of 1,1-DCE at Area 5C, confirming its presence.

Page 2-71: Paragraph 5. SRP again contends that the presence of VOCs in the lubrication oil is the result of partitioning of the regionally contaminated groundwater and is not cause for considering the SRP well site a potential source area. SRP requests that EPA either delete this statement or condition it with language that indicates that the VOCs were present in the oil as a result of partitioning from the regionally contaminated groundwater.

RESPONSE:

As stated previously in this Reponse Summary, SRP has not provided support for its hypothesis concerning oil partitioning. Attempts have been made at North IBW to correlate shallow soil gas results to water table contamination, without success. EPA finds these efforts more representative than the Gradient model and does not agree the VOC results are a result of water table contamination.

Page 2-75: EPA notes that observed levels of soil-gas contaminants may be the result of diffusion from the underlying groundwater. Yet EPA, in the VLEACH Model contained in Appendix K of the draft report, assumes that this diffusion does not occur. SRP contends that EPA's assumption applied in the VLEACH Model is not supported by the data reported from the soil vapor monitor well at Area 10.

RESPONSE:

EPA does not assume that diffusion does not occur from the water table. However, EPA does not agree with SRP's interpretation of the significance of diffusion as a factor in evaluation of vadose zone contamination as a continuing source.

Page 2-80: SRP notes that EPA qualifies its language regarding the presence of VOCs in lubricating oil for the City of Scottsdale well locations with SRP's contention regarding VOC partitioning but does not include such qualifiers for SRP well locations.

RESPONSE:

Please refer to page 2-30. The same qualifications made for the City of Scottsdale wells have been made for the SRP wells.

Page 2-85: SRP disagrees with EPA's conclusion that significant VOC contamination is present at Area 5B. SRP contends that there is no VOC contamination of the soils at Area 5B, and that the low level soil-gas levels identified are consistent with the levels expected for a region underlain by contaminated groundwater. SRP contends that no additional study is warranted at Area 5B.

RESPONSE:

No correlation was found at NIBW between shallow soil gas and groundwater concentrations. EPA contends that the shallow soil gas contamination requires investigation.

CHAPTER 3: GROUNDWATER CONDITIONS

Page 3-14: SRP requests that the perforated interval notation for SRP well 23.6E-6N be modified to reflect that the uppermost perforations have been sealed to an approximate depth of 199 feet below land surface.

RESPONSE:

SRP will note that this perforated interval is indicated in the RI/FS on page 3-15.

Page 3-49: SRP disagrees with EPA's conclusion that cable tool installed wells would act as a vertical conduit for fluids from the upper unit to lower units solely on the basis of the well installation method. As discussed in the cover letter, cable tool installation of wells in the sediments of the IBW area would not be prone to the formation of a continuous annulus on the outside of the well casing. Vertical migration along the well casing would be comparable to vertical migration within the aquifer materials. SRP agrees, however, that vertical migration of UAU waters to the lower units is possible where walls are screened across multiple aquifer units. Nevertheless, the volume of UAU water that would migrate to the lower units via these pathways would be relatively minor and would be remediated as part of the remedial activities undertaken for the Scottsdale Operable Unit.

RESPONSE:

SRP's confidence in the cable tool method's sealing of the borehole is not shared by EPA. It is apparently not shared by ADWR, as they require grouting of a minimum 1-1/2-inch annulus around the outside of casings. In cable-tool drilling, the drive shoe is larger than the casing, and the even swelling of the sandy silts-clays of the MAU cannot be relied upon or tested for integrity once the casing is in. Experience from logging and sampling of similar wells at the Phoenix-Goodyear Airport Superfund site indicated that significant movement of contamination occurs outside of cable tool casings under vertical hydraulic gradients much smaller than at NIBW.

SRP's comment does not note that EPA did not specify decommissioning or the modification method. EPA has not selected decommissioning of the wells in the ROD. Should remedial action at NIBW require action concerning SRP wells, SRP would be asked for assistance in identifying approaches which preserve the use of the wells to an extent consistent with the remedial action objectives.

The volume of water contributed may be minor, but the mass of contaminants introduced to the MAU and LAU may significantly extend the required duration of the Scottsdale OU remedy. These potential impacts should be addressed during evaluations of the Scottsdale OU remedy.

Page 3-91, Paragraph 3: SRP requests that EPA clarify the second to last sentence in the paragraph (regarding decreases of VOC contamination over time). As written, it is difficult to determine what EPA is attempting to conclude.

RESPONSE:

The referenced paragraph was clarified in the Public Comment Draft.

Page 3-97, Paragraph 3: SRP is unclear as to EPA's intent in drawing inferences from recent UAU monitor well data for TCE concentrations in relation to the referenced historical concentration of TCE in cascading water. SRP feels it is misleading to reference water quality data, collected approximately 9 years apart, in this manner. If the cascading water is considered representative of the water quality of the upper unit, the observed reduction of VOCs would be consistent with source removal and flushing/ dilution over time, as recognized by EPA on page 3-91. SRP requests that EPA delete this comment.

RESPONSE:

EPA believes it is important to present all of the available data. EPA does not believe that presenting all of the data is misleading. Since the dates when the data were collected are presented, readers may evaluate the changes over time for themselves.

Page 3-106: SRP recommends that EPA evaluate the PCE plume reported to exist in the region of the Arcadia Water Company Wells. The nature and level of contamination in the region of the Arcadia Water Company wells suggests that there may be as of yet unidentified sources of contamination in the region. A complete and accurate source identification is critical for the remedial activities that will be implemented in the IBW area.

RESPONSE:

It is not clear that a separate "plume" of contamination exists in the vicinity of the AWC wells. Monitoring of the newly installed PA-series wells should assist in making these interpretations.

CHAPTER 4: SURFACE WATER

Page 4-1: SRP notes that City of Scottsdale production wells have also been used to supply the ponds in the IBW area.

RESPONSE:

The report clearly states this fact on page 4-1.

CHAPTER 5: IDENTIFICATION AND SCREENING OF REMEDIAL TECHNOLOGIES

Page 5-1: SRP agrees that contamination in UAU groundwater would be expected to enter the MAU/LAU over time. SRP does not agree that all residual contamination in the vadose zone would enter the groundwater of either the UAU or the MAU. Additionally, SRP contends that no evaluation has been performed on the expected longevity of the MAU/LAU remediation; therefore, it is inappropriate for EPA to draw conclusions on the impact that UAU groundwater migration will have on the longevity of the Scottsdale Operable Unit.

RESPONSE:

EPA does not state that all residual contamination in the vadose zone will enter the UAU or the MAU. It is reasonable and appropriate to conclude that continued impacts to the UAU or MAU from vadose zone contamination will lengthen the overall ground-water cleanup if other measures are not taken.

Page 5-25, Figure 3-3 (3 of 3): SRP requests that EPA remove the reference to the city of Goodyear as the municipal end use and the Loral Corporation of the Phoenix-Goodyear Airport as the industrial end use. Those entities are not viable alternatives for groundwater produced in the IBW area of Scottsdale.

SRP also requests that EPA re-evaluate the agricultural end-use alternative. No rationale is provided for deleting this option from further evaluation. EPA should keep in mind that SRP has a right to produce groundwater in the IBW area. This right, and SRP's ability to effectively manage water resources for the Phoenix metropolitan area, has been impacted by the contamination in the IBW area. SRP contends that treated groundwater, produced from the UAU in the IBW area, could readily be conveyed to the SRP surface water transmission system and supplied to agricultural users downstream, providing for a beneficial end use of the treated water. SRP requests that EPA further consider this end use alternative and evaluate it on its merits. As the transmission system is already in place, agricultural end use would likely be a more cost effective option. Additionally, the risk for human exposure is reduced as the water supply is not used for drinking water purposes.

RESPONSE:

SRP's comment is inconsistent with two contacts made by CH2M HILL with SRP, once in 1986 and again in 1989 during preparation of the RI/FS, in which SRP indicated only the diffiulties associated with such a delivry if it were to be interested at a later date. Assuming that SRP has changed its interest in the remedial action water, EPA's experience (with Scottsdale OU negotiations and at the Phoenix-Goodyear Airport) with end uses other than recharge indicates that the operational, contractual, and institutional challenges are substantial.

CHAPTER 7: EVALUATION OF UAU GROUNDWATER EXTRACTION ALTERNATIVES

SRP does not concur with EPA's assessment that groundwater extraction of contaminated groundwater from the UAU is necessary. The limited areal extent of the contamination and the limited extent of saturated conditions in the UAU preclude

implementation of an effective remediation program. Further, the UAU is in hydraulic connection with the MAU, thus, groundwater from the UAU will, over time, migrate into the MAU. Ultimately, groundwater from the UAU would be extracted from the production wells in the MAU and treated by air stripping during the course of MAU/LAU remediation.

RESPONSE:

SRP is referred to EPA's proposed plan, which is practically identical to SRP's proposal, though SRP states it as being contradictory to EPA.

Page 7-7, Paragraph 3: The City of Scottsdale is no longer proposing to recharge surface water in the IBW area as reported by EPA. Through the course of discussions for the remedial action program for the MAU/LAU in the IBW area, the City withdrew its proposal to recharge surface water. The City did, however, reserve the right to recharge treated groundwater in the northern portion of the IBW area but has no plans for such action at this time. SRP requests that any discussion of Scottsdale recharging SRP surface water supplies be deleted from the draft report. Any recharge of SRP surface water supplies is outside the scope of the IBW Superfund project.

RESPONSE:

SRP will note that the Scottsdale recharge project is not evaluated as an element of the UAU remedial action alternatives.

Page 7-9: SRP disagrees with EPA's conclusions regarding production well sealing and oil removal. These objections are discussed further in the cover letter and the comments for pages 7-12 and 7-13. SRP requests that EPA delete any reference to these actions as part of the no action alternative, alternative 1, and alternative 2.

RESPONSE:

SRP's confidence in the cable tool method's sealing of the borehole is not shared by EPA. It is apparently not shared by ADWR, as they require grouting of a minimum 1-1/2-inch annulus around the outside of casings. In cable-tool drilling, the drive shoe is larger than the casing, and the even swelling of the sandy silts-clays of the MAU cannot be relied upon or tested for integrity once the casing is in. Experience from logging and sampling of similar wells at the Phoenix-Goodyear Airport Superfund site indicated that significant movement of contamination occurs outside of cable tool casings under vertical hydraulic gradients much smaller than at NIBW.

RESPONSE (Continued):

SRP's reference to EPA monitoring wells with natural packs is irrelevant considering that those intervals are typically short (less than 70 feet), within one hydrostratigraphic unit, and located below grout-sealed intervals. Formation collapse is not relied upon, nor even needed in the slotted intervals of the EPA monitoring wells to restrict vertical movement. By contrast, the production wells of conern have no grout seals outside of casings 500 to 1,200 feet long which cross hundreds of feet of the MAU.

SRP's comment does not note that EPA did not specify decommissioning or the modification method. Neither has EPA selected decommissioning of the wells in the ROD. Should remedial action at NIBW require action concerning SRP wells, SRP would be asked for assistance in identifying approaches which preserve the use of the wells to an extent consistent with the remedial action objectives.

Page 7-11: Scottsdale has withdrawn its proposal to recharge SRP surface water supplies in the IBW area. SRP requests that EPA delete any reference to the proposal to recharge SRP surface water. Scottsdale has, however, retained its rights to recharge treated groundwater in the northern portion of the IBW area, although the city has no plans to pursue that option at this time. SRP recommends that EPA delete any evaluation of recharge along the southern boundary of the site since such recharge is not a viable option and is outside the scope of the IBW Superfund project.

RESPONSE:

SRP will note that the Scottsdale recharge project is not evaluated as an element of the UAU remedial action alternatives.

Page 7-12, Paragraphs 1 & 2: SRP believes that EPA's recommendation to install UAU monitor wells based on 40-acre grid in the target area is excessive and is not supported by site conditions. SRP also believes that bi-monthly water level monitoring and quarterly water quality sampling for a 30-year interval is excessive for the scope of the proposed remediation program.

RESPONSE:

The proposed monitoring well density leaves more than 1,200 feet unmonitored between wells in the UAU. It is believed to be the minimum protective sampling network, not excessive, as stated by SRP.

The sampling frequency will be revised as review of available data indicates is warranted.

Page 7-12, Paragraph 3: Salt River Project disagrees with EPA's recommendations that several SRP production wells in the IBW area be modified or decommissioned. Cable tool well installation in unconsolidated sediments consists of drilling an undersized hole and driving an oversized casing to depth. The casing, equipped with a drive shoe only a fraction of an inch larger than its outside diameter, is advanced as the borehole is advanced to depth. The unconsolidated sediments of the UAU would readily collapse against the outside of the well casing, thus, there would be no continuous annular space through which fluids could migrate. Vertical migration along the well casing would be comparable to vertical migration within the aquifer materials themselves. EPA has installed monitor wells in the IBW area with "a natural gravel pack" indicating that EPA is familiar, and indeed comfortable, with the process of formation sediments collapsing against monitor well casings. EPA's experience suggests that EPA would recognize that the infilling of sediments would also occur during production well installation.

SRP believes that modifying the well will not significantly reduce potential vertical migration in the near well environment and is not, therefore, justified by the available data. SRP also believes that to abandon its production wells in the area would be shortsighted in light of SRP's role as a regional water provider, now and in the future.

RESPONSE:

SRP's confidence in the cable tool method's sealing of the borehole is not shared by EPA. It is apparently not shared by ADWR, as they require grouting of a minimum 1-1/2-inch annulus around the outside of casings. In cable-tool drilling, the drive shoe is larger than the casing, and the even swelling of the sandy silts-clays of the MAU cannot be relied upon or tested for integrity once the casing is in. Experience from logging and sampling of similar wells at the Phoenix-Goodyear Airport Superfund site indicated that significant movement of contamination occurs outside of cable tool casings under vertical hydraulic gradients much smaller than at NIBW.

SRP's reference to EPA monitoring wells with natural packs is irrelevant considering that those intervals are typically short (less than 70 feet), within one hydrostratigraphic unit, and located below grout-sealed intervals. Formation collapse is not relied upon, nor even needed in the slotted intervlas of the EPA monitoring wells to restrict vertical movement. By contrast, the production wells of concern have no grout seals outside of casings 500 to 1,200 feet long which cross hundreds of feet of the MAU.

SRP's comment does not note that EPA did not specify decommissioning or the modification method. Neither has EPA selected decommissioning of the wells in the ROD. Should remedial action at NIBW require action concerning SRP wells, SRP would be asked for assistance in identifying approaches which preserve the use of the wells to an extent consistent with the remedial action objectives.

Page 7-13, Paragraph 1: Salt River Project believes that EPA's recommendation that lubricating oil be removed from production wells on a semi-annual basis is excessive. SRP has provided data to EPA previously that demonstrates that there are no VOCs in the lubricating oil in its unused state. Neither are there any well maintenance practices employed at the well sites that would introduce VOCs into the lubricating oil. Any VOCs that may be present in the oil are a result of the VOCs partitioning out of contaminated groundwater and into the oil over time.

SRP is conducting laboratory experiments to demonstrate the partitioning of TCE between water and oil. The experiments are expected to demonstrate that TCE will partition from contaminated water into oil and that the magnitudes of VOC concentrations present in oil will be elevated with respect to the original concentration in water as a result of VOC partitioning from a large volume of water into a small volume of oil. Preliminary results of the laboratory experiments confirm this hypothesis. The preliminary results also confirm that TCE is miscible in oil as previously maintained by SRP, and noted in standard chemical references. These results support SRP's position that the elevated levels of VOCs detected in floating lubrication oil are a result of partitioning from the regionally contaminated groundwater.

It is SRP's practice to remove lubricating oil from its production wells during routine maintenance cycles. In order to remove the oil, the well must be taken out of service while the pump and all down-hole equipment are removed. The oil is removed, tested for total halide concentrations in accordance with EPA requirements and protocols, and handled accordingly. This process is time consuming and expensive. It is SRP's belief that removing the oil during its routine maintenance cycle is sufficient to allay any potential environmental concerns and there is no justification to remove the oil on an expedited schedule. To go through the oil removal process on a 6-month cycle would severely impact the abilities of SRP or the City of Scottsdale to produce groundwater in the area, impacting the groundwater remediation program that will be implemented in the IBW area.

RESPONSE:

SRP, in fact, did not provide the results at the August 31, 1990, meeting or since, to EPA's knowledge. Assuming appropriate scientific methods were used, partitioning measurements using oil and ground water from the actual wells would be very useful in evaluating SRP's contentions. As it stands, EPA has not received information which would change the statements made in the RI/FS concerning floating oil and VOCs.

EPA agrees that removal of floating oil could be effectively conducted during SRP's and Scottsdle's standard pump maintenance activities--approximately every 3 to 5 years.

Page 7-13, Paragraph 3: SRP requests that EPA delete any reference to production well sealing as a component of the remedial alternatives. As discussed previously, SRP contends that EPA conclusions regarding vertical migration of fluids, based on well installation methodology, are erroneous.

RESPONSE:

SRP's confidence in the cable tool method's sealing of the borehole is not shared by EPA. It is apparently not shared by ADWR, as they require grouting of a minimum 1-1/2-inch annulus around the outside of casings. In cable-tool drilling, the drive shoe is larger than the casing, and the even swelling of the sandy silts-clays of the MAU cannot be relied upon or tested for integrity once the casing is in. Experience from logging and sampling of similar wells at the Phoenix-Goodyear Airport Superfund site indicated that significant movement of contamination occurs outside of cable tool casings under vertical hydraulic gradients much smaller than at NIBW.

SRP's comment does not note that EPA did not specify decommissioning or the modification method. Neither has EPA selected decommissioning of the wells in the ROD. Should remedial action at NIBW require action concerning SRP wells, SRP would be asked for assistance in identifying approaches which preserve the use of the wells to an extent consistent with the remedial action objectives.

CHAPTER 8: EVALUATION OF WATER END USE ALTERNATIVES

As stated previously, SRP does not support EPA's conclusion that extraction of contaminated UAU groundwater is necessary. Therefore, the end use alternative evaluation would not be required. Nevertheless, SRP must address concerns it has regarding the evaluation and requests that EPA provide further consideration of the agricultural end use alternative. SRP also requests that EPA consider wellhead treatment with the agricultural end use alternative in order to avoid the capital costs of extensive pipelines required with a central treatment plant.

RESPONSE:

The ROD does not require extraction of UAU ground water.

RESPONSE (Continued):

SRP's comment is inconsistent with two contacts made by CH2M HILL with SRP, once in 1986 and again in 1989 during preparation of the RI/FS, in which SRP indicated only the diffiulties associated with such a delivry if it were to be interested at a later date. Assuming that SRP has changed its interest in the remedial action water, EPA's experience (with Scottsdale OU negotiations and at the Phoenix-Goodyear Airport) with end uses other than recharge indicates that the operational, contractual, and institutional challenges are substantial.

Re-analysis of the efficacy of wellhead treatment versus central plant treatment by CH2M HILL confims the approach used for development of alternatives for the RI/FS. Wellhead treatment of several wells in this situation is not as efficient as central treatment. This inefficiency was large enough that it precluded the development of a formal alternative for evaluation. Wellhead treatment may be more practicable if fewer extraction wells were utilized.

Page 8-2: SRP requests that EPA re-evaluate agricultural end use as a viable option. EPA dismisses the evaluation without adequate explanation. SRP, which also has groundwater rights in the area, has the existing structure in place to accept treated groundwater and distribute it to agricultural users. Providing the treated water to the SRP system has the advantage of not requiring the extensive capital improvements required for a municipal end use and would, therefore, be more cost effective.

Page 8-4: SRP notes that EPA references some of the potential advantages of utilizing SRP as the end user of treated groundwater. EPA's position on this page appears to be inconsistent with EPA's dismissal of the agricultural end use alternative on page 8-2.

RESPONSE:

SRP's comment is inconsistent with two contacts made by CH2M HILL with SRP, once in 1986 and again in 1989 during preparation of the RI/FS, in which SRP indicated only the diffiulties associated with such a delivry if it were to be interested at a later date. Assuming that SRP has changed its interest in the remedial action water, EPA's experience (with Scottsdale OU negotiations and at the Phoenix-Goodyear Airport) with end uses other than recharge indicates that the operational, contractual, and institutional challenges are substantial.

Pages 8-10 through 8-20: SRP recommends that EPA provide consideration to well head treatment facilities for the groundwater extraction alternatives if groundwater extraction is ultimately required. Capital savings from reduced pipeline requirements,

design and construction costs for the treatment facilities, and (in the event the agricultural end use alternative is selected) capital costs for connecting to the municipal system would be substantially reduced. CERCLA requires that remedial actions be cost effective, yet EPA does not provide any evaluation of alternative designs to allow for an evaluation of the cost effectiveness of the recommended extraction alternative.

RESPONSE:

Reanalysis of the efficacy of wellhead treatment versus central plant treatment by CH2M HILL confims the approach used for development of alternatives for the RI/FS. Wellhead treatment of several wells in this situation is not as efficient as central treatment. This inefficiency was large enough that it precluded the development of a formal alternative for evaluation. Wellhead treatment may be practicable if fewer extraction wells were utilized.

CHAPTER 9: EVALUATION OF GROUNDWATER TREATMENT ALTERNATIVES

As stated previously, SRP does not support EPA's conclusion that extraction of contaminated UAU groundwater is necessary. Therefore, the end use alternative evaluation would not be required. Nevertheless, for purposes of discussion, SRP does provide comments on the evaluation and requests that EPA provide further consideration of the agricultural end use alternative. SRP believes that if treated groundwater were directed to the lakes in the IBW area and the SRP system, it would be more cost effective to implement a well head treatment option, rather than a central treatment plant, in order to avoid the capital costs of extensive pipelines.

Page 9-1: SRP requests that EPA provide further consideration to well head treatment options. EPA states that central treatment facility was considered since a preliminary evaluation, not detailed in the draft report, suggested that for wells approximately one mile from the treatment plant a central location was more economical than individual well head treatment. SRP disagrees with EPA's assumption for several reasons. First, the extraction well locations proposed (see Figures 7-1 and 7-2) for the 2 alternatives extend beyond the one mile range from the treatment plant. Second, the treated water is not used near the treatment plant in most end use alternatives, requiring almost double the amount of transport piping be installed. By considering well head treatment alternatives, in conjunction with agricultural or recreational end use alternatives, EPA may determine that a more cost effective option is available. Third, as stated by EPA, extraction wells may be deleted from the program as concentrations drop below ARAR levels. The treatment plant design is based on two fundamental variables, inflow capacity and inflow VOC concentration. Well head treatment allows for the greatest flexibility in operation of the extraction well network over time. By deleting wells from the extraction well program for a central treatment plant, EPA runs the risk of having

a plant poorly designed for operational conditions over time, certainly not a cost effective remedial program.

RESPONSE:

SRP's comment is inconsistent with two contacts made by CH2M HILL with SRP, once in 1986 and again in 1989 during preparation of the RI/FS, in which SRP indicated only the diffiulties associated with such a delivry if it were to be interested at a later date. Assuming that SRP has changed its interest in the remedial action water, EPA's experience (with Scottsdale OU negotiations and at the Phoenix-Goodyear Airport) with end uses other than recharge indicates that the operational, contractual, and institutional challenges are substantial.

Reanalysis of the efficacy of wellhead treatment versus central plant treatment by CH2M HILL confims the approach used for development of alternatives for the RI/FS. Wellhead treatment of several wells in this situation is not as efficient as central treatment. This inefficiency was large enough that it precluded the development of a formal alternative for evaluation. Wellhead treatment may be more practicable if fewer extraction wells are utilized.

APPENDIX B: EPA SHALLOW SOIL GAS SAMPLING

Page B-1: SRP notes that EPA recognizes that vapor phase diffusion affects the distribution of VOCs in soil gas. SRP concludes, therefore, that EPA must recognize that the VOCs will volatilize from groundwater (a process that the VLEACH model of Appendix K fails to consider) and will be transported from areas of high contamination, such as the region just above the contaminated groundwater, to areas of low concentration, such as the surface. It is this process, which EPA recognizes to occur, that accounts for the observed levels of soil gas at SRP well site 23.6E-6N.

SRP also requests that EPA provide a similar appendix that would describe the protocols that EPA was to adhere to during the course of soil sampling investigation and describe any deviations from that protocol during the course of the field investigation. As soils data are critical in EPA's evaluation of the IBW site, SRP feels that it is imperative that EPA describe the process by which data were to be collected to make possible a thorough evaluation of EPA's soils data validity. As stated previously, SRP contends that EPA's soils investigations of the SRP well sites has critical deficiencies that preclude EPA from validating its results. SRP requests that this information be provided in the draft report for external, public evaluation.

RESPONSE:

All information that SRP has requested has been provided to them.

APPENDIX C: RESULTS OF SOIL VAPOR SAMPLING

Page C-38. SRP requests that the soil-gas data reported in the Gradient report, and referenced in Chapter 2 of the draft report, be included in Appendix C. As EPA references the data, it rightfully belongs in the appendix.

RESPONSE:

The Gradient data are in the report in Table C-9.

APPENDIX D: RESULTS OF SOIL SAMPLING

SRP requests that EPA provide an appendix that describes the protocols that EPA was to adhere to during the course of soil sampling investigation and also describe any deviations from that protocol during the course of the field investigation. As soils data are critical in EPA's evaluation of the IBW site, SRP feels that it is imperative that EPA describe the process by which data were to be collected to make possible a thorough evaluation of EPA's soils data validity. As stated previously, SRP contends that EPA's soils investigations of the SRP well sites has critical deficiencies that preclude EPA from validating its results. SRP requests that this information be provided in the draft report for external, public evaluation.

SRP also requests that EPA provide all available soils data, as it mostly had for the soil-gas data, including data collected by other sources. SRP specifically requests that the soils data, and the evaluation of the EPA soils data validity, contained in the Gradient report be included in the draft report for external, public evaluation.

RESPONSE:

EPA has provided a sampling plan and technical memorandum with the results to SRP in 1987 and 1988. The Gradient data are in Chapter 2.

Soil Boring Log 5-201: SRP contends that the VOC data from this log are invalid. EPA's failure to collect and analyze an extractant solvent blank precludes EPA from determining what VOCs were introduced to the sample as impurities in the extractant solvent. SRP requests that this data, since it cannot be validated, be deleted from the draft report.

RESPONSE:

EPA disagrees with the repercussions of solvent blank analysis suggested by SRP.

APPENDIX H2: ENDANGERMENT ASSESSMENT - SITE HISTORY & BACKGROUND

Page H2-2: SRP objects to EPA's conclusion that fishing at McKellips pond continues to be restricted because of SRP's Granite Reef well discharge. EPA recognizes in the draft report that SRP has restricted the use of its contaminated wells to provide water to the ponds in the Indian Bend Wash. Further, SRP objects to EPA's reliance on personal communications three years outdated, with parties not affiliated with SRP, for information regarding SRP well utilization. Such reliance is prone to inaccuracies, as in this case. SRP requests that EPA delete these comments from the draft report.

RESPONSE:

These comments are not present in the Public Comment RI/FS report.

APPENDIX H6: ENDANGERMENT ASSESSMENT - EXPOSURE ASSESSMENT

Page H6-4: SRP objects to EPA's conclusion that the only contaminated soil located near a residential area is located at an SRP well site. SRP contends that the EPA soil data is erroneous and that there is no soil contamination at the SRP well sites. Additionally, SRP notes that other locations where soil contamination has been detected are at least proximal to residential areas, as EPA infers for the SRP well site. For EPA to make this conclusion is inaccurate and misleading. SRP requests that this comment be deleted from the draft report.

RESPONSE:

EPA does not agree. The statement remains.

APPENDIX H8: ENDANGERMENT ASSESSMENT - CONCLUSIONS

Page H8-1: SRP disagrees with EPA's conclusion regarding the assessment of ingestion exposure for SRP well 22.5E-6N. The SRP well in question is not used as a potable source, and the use of the well has been restricted both because of its location and its water quality. SRP requests that these factors be identified and considered in the ingestion exposure assessment.

RESPONSE:

EPA does not agree. The statement remains.

APPENDIX K: VLEACH MODEL STUDY

Page K-15 and K-16: SRP disagrees with EPA's assumption in the VLEACH Model that there will be no gaseous diffusion across the water table. As EPA reports, such an assumption only serves to extend the period of time that the vadose zone would contribute to groundwater contamination. SRP contends that this assumption is not consistent with the evidence collected throughout the course of the soil-gas investigations, particularly form the soil vapor monitor wells in Area 10, and would inaccurately overestimate the contribution that the vadose zone has no groundwater contamination. SRP contends that the bulk of the mass flux of soil vapor contaminants would be to zones of lower concentration, specifically toward ground surface, and would not contribute significantly to groundwater contamination. SRP contends that this is a critical deficiency in the VLEACH Modeling effort and requests that EPA reevaluate its efforts for Areas 7 and 8.

RESPONSE:

SRP will note that results of model operation with and without gaseous diffusion from the water table are provided in the RI/FS. Contrary to SRP's assertions, VLEACH presently can inorporate gaseous diffusion if the operator can estimate what the ground-water concentrations will be over the time frames of hundreds of years. SRP's assertion that diffusion from the water table is the mechanism of greatest importance for VOC transport in the vadose zone is based on a statement considering shallow vadose zones without extensive internal contamination, and therefore is not appropriate for discussions of continued migration of soil contamination at NIBW.

Assuming a residence time of 20 to 30 years at NIBW, VOC diffusion from the water table has only had a chance to have a significant impact reaching a few tens of feet above the water table at most. SRP's contention that current shallow soil gas concentrations are due to diffusion from the water table is clearly contradicted by a specific study of this phenomenon at NIBW. Montgomery & Associates measured shallow soil gas conentrations adjacent to UAU monitoring wells in September 1986. No correlation was found between a wide range of shallow soil gas concentrations and a wide range of water tale concentrations. In light of these facts, EPA disagrees with SRP's contention that the operation of VLEACH and interpretations found in the RI/FS are contradictory.

RESPONSE (Continued):

Biodegradation is possible, but cannot be quantified reliably at this time. Therefore, its rate of action cannot be relied uon to protect the ground water. If the in situ bioreaction rates for soils at NIBW are reliably quantified, they could be added to VLEACH or any equivalent model SRP may want to develop.

Contrary to SRP's assertion, evaporation above the extinction depth is accounted for in the total advection rate.

The misconception at the root of SRP's contentions in this comment appears to be that VLEACH would be run for a soil profile with no contaminant mass in the profile. If, for some reason outside of the proposed process, such a VLEACH model run were attempted under these conditions, then SRP's contention would likely be appropriate.

However, EPA intends that VLEACH be applied to areas in NIBW with soil contamination, and in these areas, diffusion of VOCs from the water table is likely an insignificant process compared to continued migration of soil contamination to the water table. EPA plans to apply VLEACH or an equivalent model to sites at NIBW with soil contamination, rather than to sites without soil contamination.

APPENDIX L: ADWR MODELING STUDY

SRP has not completed its evaluation of the most recent package submitted by ADWR regarding the model effort and requests that it be able to supplement its comments on Appendix L after its review is complete. Nevertheless, after an initial evaluation of the ADWR modeling effort, SRP has serious concerns regarding the reliability of the model results.

Salt River Project is very concerned that the modeling period is too extensive for the available database, thus, any conclusions that are drawn or inferred from the extended modeling period cannot be substantiated. Typically, a predictive modeling run will be carried out for only 2.0 times the number of years of model calibration. In this instance, that would correlate to a modeling run to the year 2000, far short of the year 2042 reported in the draft effort. SRP believes that any results or interpretations based on the extended modeling period cannot be substantiated and, in fact, may create misconceptions that have significant impacts on the planned IBW remediation. SRP believes that the duration of the modeling run is particularly significant in that the Department predicts that the remedial action of the MAU and LAU (the Scottsdale Operable Unit) in the IBW area will not fully capture the contaminant plume. SRP believes that such a conclusion is unjustified given the limitations of the model and may, in fact, create unwarranted obstacles in the implementation of the Scottsdale OU.

RESPONSE:

ADWR agrees that the simulation period is probably too long. However, we feel that this is simply another case in which compromises must be made in order for the model to provide any useful results. We will be the first to agree that the projected pumpage and recharge rates for 50 years into the future are questionable. But we also believe that the model is still the best available predictive tool for determining remedial actions for the site. This comment emphasizes the need for continued monitoring and perhaps modeling at the site.

Salt River Project also feels that the vertical discritization in the model is excessive for the available database. Insufficient depth specific data is available to accurately represent 12 horizontal layers in the modeling effort. Unit or depth specific data is available only for select depths from limited areas within the model study boundaries. The Department was, therefore, compelled to make assumptions, based on limited data, for the appropriate physical parameters for many of the layers in the model in order to make the model runs. Additionally, the Department's assumptions and the process by which the assumptions were developed are not adequately substantiated in the memorandum.

RESPONSE:

ADWR views the level of vertical discritization as a bare minimum to reasonably describe the geology of the model area. Since the geologic contacts between the units do not lie parallel to any arbitrary datum, it is impossible to accurately describe the variation in geologic contact elevations with fewer layers. The RI/FS Appendix L modeling report does include a detailed discussion of the assumptions made in the construction of both the ground-water flow and contaminant portions of the model.

Salt River Project is further concerned over the model's apparent sensitivity to vertical flow components in the IBW area. Estimation of horizontal flow is sufficiently complicated to make representative modeling a difficult process. Estimation of vertical flow, of which even fewer data are available, is so complex as to cast doubt on the reliability of the modeling results.

RESPONSE:

ADWR believes that the field data, calculations, and the various models all indicate that vertical flow is a highly important factor. The three-dimensional modeling approach was specifically selected by the committee in recognition of that fact. We agree that vertical flow in the model area is complex. But we feel that the model reasonably simulates vertical flow, based on the current field data and hydrologic interpretations. Additional data on vertical head distributions and vertical contaminant distributions would be useful.

SRP requests that EPA, and DWR, give immediate consideration to the apparent weaknesses of the modeling effort to eliminate any misconceptions regarding the implementation of the Scottsdale Operable Unit or the fate of contamination in the UAU groundwater.

RESPONSE:

EPA and ADWR will continue to consider the necessity for and the appropriateness of further modeling work by ADWR at NIBW.

COMMENTS FROM SIEMENS CORPORATION

INTRODUCTION

Siemens appreciates the opportunity to comment on the Public Comment Draft of the Remedial Investigation and Feasibility Study Report ("RI/FS") for the North Indian Bend Wash ("NIBW") portion of the Indian Bend Wash Superfund site. Several of Siemens' comments on the earlier Project Committee Draft were incorporated in the Public Comment Draft, and Siemens commends the responsiveness of the Environmental Protection Agency ("EPA") in giving serious consideration to the earlier comments. The draft RI/FS, however, has not taken into account key comments previously submitted by Siemens. Because these comments address important issues and, in a number of cases, point out important errors or omissions in the Public Comment Draft, Siemens requests that the Agency address the points summarized below, including the following:

* Siemens demonstrated in its comments on the Project Committee Draft that the description of potential contaminant sources for Areas 7, 8, and 11 included serious factual errors relating to Dickson Electronics and failed to identify key additional sources. Many of the factual errors remain in the Public Comment Draft, and Parts I, II, and III of Siemens' comments highlight the most important points. To the extent EPA selects vadose zone remediation for Areas 7 and 8 and further study for Area 11, the factual errors must be corrected so that key responsible parties will be included in any enforcement activities.

RESPONSE:

Before initiating enforcement actions for the implementation of the vadose zone and UAU remedies, EPA will consider all information available to EPA regarding potentially responsible parties.

* Siemens demonstrated in its earlier comments that vadose zone remediation in Area 8 is not supportable because Area 8 is not a former or current ground water contamination source and does not pose a "continued threat" to ground water. Siemens' earlier comments were based on a careful evaluation of current data and commonly accepted hydrogeological principles. These points are discussed further in Part IV of these comments and should be included in the final RI/FS.

RESPONSE:

See response to Part IV.A and IV.B of these comments.

* EPA has conducted an exhaustive identification and analysis of remedial alternatives for the NIBW Operable Unit and has indicated that it will select Alternative 2 for Upper Alluvial Unit ("UAU") remediation. As indicated in Part V of these comments, Siemens supports selection of Alternative 2, which includes monitoring the UAU contamination while it is remedied through the Scottsdale Operable Unit ("OUI") ground water extraction and treatment system. Alternative 2 will be fully protective of human health and the environment and will be significantly more cost effective than other alternatives reviewed by the Agency.

RESPONSE:

EPA is selecting monitoring of the UAU over UAU extraction alternatives at this time. However, if the mass of VOCs in the UAU does not decrease continuously and significantly, or if UAU contamination spreads to previously uncontaminated areas in the UAU, MAU, or LAU, EPA will reassess the appropriateness of ground-water extraction from the UAU.

I. AREA 7

A. ROLAMECH SHOULD BE LISTED AS A TCE SOURCE AND SHOULD BE INCLUDED IN ANY NIBW ENFORCEMENT ACTION

The Public Comment Draft states that the Rolamech Company, Inc. ("Rolamech") used trichloroethane ("TCA") in Area 7. These statements reflect only partial truths. Importantly, documents in the administrative record confirm that Rolamech has utilized trichloroethylene ("TCE"), and technical evidence in the record links Rolamech's TCE use with on-site TCE contamination.

1. EPA Has Evidence That Demonstrates Rolamech's TCE Use

In response to a 1982 EPA information request, Rolamech submitted a letter to EPA with an attached list of the chlorinated solvents it purchased between December 1978 and December 1981. See letter from William H. Highsmith to David S. Mowday (August 9, 1982) (Appendix 1). The list confirms that during this period Rolamech used at least nine 55-gallon drums of "Trichlor," a common term for TCE. See e.g., EPA, Estimating Air Emissions from Sources of Perchloroethylene and Trichloroethylene (Aug. 1989) (Appendix 2). The list of solvent purchases demonstrates that Rolamech used approximately 500 gallons of TCE between 1979 and 1981 alone, more than enough TCE to account for all of the TCE contamination in Area 7.

The use of TCE by Rolamech is consistent with Rolamech's principal activity -- manufacturing ball point pens and metal machining. See Public Comment Draft at Table A-8. In its 1982 letter to EPA, Rolamech stated that it is "an automatic

screw machine shop, producing a line of ball point pens as a proprietary item and also doing job shop work as available." Appendix 1 at 1. EPA documents confirm that TCE commonly is used as a solvent for cleaning metal surfaces in metalworking operations. See EPA, Survey of Trichloroethene Emission Sources 4-1 (July 1985) (Appendix 3).

2. City Directories Confirm that Rolamech Has Operated at its Current Location Since 1972

Not only has Rolamech used TCE, but it has operated in Area 7 for nearly twenty years. (By way of comparison, city street directories confirm that Dickson Electronics leased buildings in Area 7 for about six years, from approximately 1961 to 1967.) See Scottsdale and Paradise Valley Arizona Consurvey Directory (Mullen-Kille of Phoenix, Inc.); Cole's City Directory of Greater Phoenix (Cole Co.) (Appendix 4).[4]

In its August 1982 letter, Rolamech contended that it began operations in Area 7 in May 1977. Notes from an EPA staff member present at a 1989 internal briefing indicate that EPA relied on this representation in making its decision not to include Rolamech in the CERCLA Section 106 Order for OUI. See Handwritten Notes at 2 (February 16, 1989) Appendix 5). Although the Public Comment Draft now states that Rolamech has operated in Area 7 since 1974, the city directories locate Rolamech at its current site beginning in 1972, a period when TCE use is likely to have been even more pervasive than in the mid-to-late-1970s.[5] If Rolamech's confirmed TCE usage during the 1979-1981 period is applied to the full 1972-1981 period, Rolamech utilized more than 1600 gallons of TCE in Area 7.

3. Rolamech Has Stored Solvents in a Part of Area 7 that is a "Hot Spot" of TCE Contamination

Rolamech's solvent storage area is an obvious source of TCE contamination. For many years, the solvent storage area has been located in the position marked with an "X" in the attached aerial photograph. See Appendix 6. Samples from this location include several of the highest concentrations of TCE detected in soil gas in Area 7. For example, soil gas samples 7-001 and 7-002, located near the solvent storage area, include concentrations of 27 and 25 ug/l of TCE, respectively. In addition, samples from soil boring 7-208, which is immediately adjacent to the solvent storage area, include concentrations of TCE at 400 ug/kg. These samples were taken at locations in which Dickson Electronics never operated and to which Dickson Electronics did not have access. The samples therefore reflect Rolamech contamination, not Dickson Electronics contamination.

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[4] Siemens provided a full copy of the city directories to EPA with its earlier comments and will provide additional copies upon request.

[5] The directories indicate that Rolamech was located at 3713 North 75th Street beginning in 1972, and 3719 North 75th Street from 1973 to the present. The 3713 and 3719 North 75th Street addresses comprise the same building.

* * *

The evidence discussed above demonstrates that Rolamech used large quantities of TCE in Area 7, and that releases of TCE occurred on Rolamech's property. It is extremely important that this information be included in the RI/FS as a predicate for the implementation of vadose zone remediation in Area 7.

B. THE CITY OF SCOTTSDALE IS A POTENTIALLY RESPONSIBLE PARTY

The Public Comment Draft acknowledges that the City of Scottsdale currently owns and operates a warehouse at 7501 East Second Street. The street directories indicate that the City has operated at the 7501 East Second Street location since at least 1974 and that Dickson Electronics never leased the 7501 East Second Street building. See Appendix 4. As the owner and operator of the 7501 East Second Street property, the City of Scottsdale is liable for response costs associated with remediation of Area 7 under CERCLA Section 107(a).

Siemens requests that the description of Area 7 be amended to include an explanation of the City's status as an owner and operator of property in Area 7. In addition, the final RI/FS should note that the City is a potential TCE source for Area 7. The City Graphics Department has operated at 7501 East Second Street for many years. Graphics operations are common users of solvents, including TCE, for cleaning metal surfaces used in printing.

Finally, the RI/FS should be amended to note that technical evidence gathered by EPA suggests that the City may be responsible for some releases of TCE in Area 7. Data generated by soil gas sample 7-109 illustrate the point: This sample was taken from a location adjacent to the City building and far from any former Dickson Electronics location. The sample reflects TCE concentrations higher than samples taken adjacent to former Dickson Electronics facilities. Similarly, samples from 7-003, -004 and -005, all of which demonstrate elevated TCE levels, were taken from locations much closer to the City facility than to any former Dickson Electronics facility.

II. AREA 8

EPA acknowledged in the Public Comment Draft that Area 8 has been an industrial area for many years. In fact, the area has included the "Scottsdale Industrial Park" for approximately 35 years. See Scottsdale Progress at 1 (Aug. 12, 1955) (Appendix 7). Siemens has developed additional information about the sources identified in the Public Comment Draft and has located a number of new sources. Siemens requests that these new and existing sources be identified in the final RI/FS description of Area 8, as a predicate for potential follow-up enforcement action.

First, of the sources identified in the Project Committee Draft, the Public Comment Draft lists Marro, Inc. as a potential source, but it fails to list Leonard Marks, the former owner of Marro, Inc. See Public Comment Draft at 1-23 and 2-56. This important error should be corrected. In addition, the Public Comment Draft correctly notes that the City of Scottsdale Streets Department operated a sign painting facility at 115 East Second Street for more than 10 years -- from before 1960 until 1970. The Public Comment Draft also should state that the facility used solvents for cleaning street signs.

Second, Siemens has identified the following additional potential sources in Area 8:

- Security Sciences Corporation. This company manufactured electronic burglar alarms at 3621 Wells Fargo Avenue from 1973 to 1980.

- Video Control Corporation. This company manufactured electronic components at 3621 Wells Fargo Avenue from 1970 to 1972.

- Strange Laboratories, Inc. This company manufactured cosmetics at 3624 Wells Fargo between 1965 and 1972. See Scottsdale Progress (Jan. 11, 1965) (Appendix 8). A recent government survey indicated that many cosmetics contain TCE. See Proposed Identification of Trichloroethylene as a Toxic Air Contaminant (July 1989) (Appendix 9). Accordingly, TCE is likely to have been used by Strange Laboratories.

- Pass Press Printing. This company conducted printing operations in Area 8 at 10 East 2nd Street from 1964 to 1966. In the 1960s, printing operations commonly used solvents such as TCE to clean printing presses.

- Metal Fabrication and Cleaning Operations. The following current and former businesses have engaged in metal working activities in Area 8 that are likely to have involved TCE and other solvent use: Cavalier Plumbing (pre-1960 to present); Jennings Plumbing Co. (pre-1960 to 1980); Standard Surgical Supply (1974 to 1980); Southwestern Jewelry Manufacturing Co. (early 1960s); and Scotty's Shop (pre-1960 to 1980).

- Automotive Repair Shops. Automotive operations are common users of TCE and other solvents used for degreasing. Current and former automotive shops in Area 8 include the following: Competition Cars International; Ferguson Autobody; Wallace Garage; Red's Garage; Hodgson Auto Rebuilder; Harrie's Body Shop; Ray's Autobody Shop; and Scottsdale Wrecker Service.

* * *

As with Area 7, EPA should not limit its source identification and enforcement activity to one or two PRPs out of this array of potential sources. Instead,

all sources should be identified in the final RI/FS and included in any enforcement action. To the extent that EPA resources are limited, Siemens is available to assist EPA in these important source identification activities.

III. AREA 11

A. The Final RI/FS Should Provide the Correct Information About the Dickson Electronics Facility in Area 11

In its earlier comments, Siemens provided evidence from city directories that Dickson Electronics leased only one part of the strip shopping center located in Area 11. Dickson Electronics' address was 8011 East Roosevelt Street, which places it near the center of the shopping center. Siemens demonstrated that Dickson Electronics operated a non-manufacturing operation at the location for less than one year (between 1966 and 1967).

Despite the conclusive information provided by the city directories, the Public Comment Draft erroneously refers to the location of the Dickson Electronics facility as "the southeast corner of Hayden and Roosevelt," and cites the years of operation as 1964 to 1966. See Public Comment Draft at A-12. These misstatements must be corrected. Siemens has obtained additional confirmation that the Dickson operation at Area 11 was very limited; it did not involve manufacturing activities, and lasted only for a period of less than a year (1966-1967).

RESPONSE:

Rolamech and the City of Scottsdale already were identified in Appendix A of the RI/FS. EPA has not included the additional potential source operations identified by Siemens for Areas 7, 8, and 11. Siemens provides general assertions as to use of solvents by these entities.

Before initiating enforcement actions for the implementation of the vadose zone and UAU remedies, EPA will consider all information available to EPA regarding potentially responsible parties.

IV. THE CONCLUSIONS ABOUT THE CONTRIBUTION OF AREA 8 TO GROUND WATER CONTAMINATION AND THE RECOMMENDATIONS FOR THIS AREA ARE NOT SUPPORTED AND SHOULD BE REVISED.

A. The Public Comment Draft Contains Insupportable Assumptions that Invalidate the VLEACH Modeling

The hydraulic gradient and conductivity used in the ground water mixing model (listed in Table K-6 of the RI/FS) are not supportable, and the use of these values results in overestimation of the TCE concentrations in ground water. The

hydraulic gradient used (0.001) is at least 5 times lower than can be reasonably determined given the available data. The hydraulic conductivity used (100 gpd/ft^2 or 13.4 ft/day) also is unreasonably low compared to the average of pumping-test results for the MAU (listed in Table 3-2 of the RI/FS), which is 195 gpd/ft^2 or 26 ft/day. The combined effect of underestimating these two factors results in an overestimation of the predicted ground water concentrations by approximately one order of magnitude. These shortcomings should be corrected in the final RI/FS.

RESPONSE:

EPA has reviewed the aquifer parameters for the MAU near Area 8 and does not agree with Siemens comments. It is not appropriate to use parameters that relate almost exclusively to coarse-grained intervals.

B. The Data Do Not Support Vadose Zone Remediation for Area 8

The data from Area 8 indicate that TCE contamination is trapped at low levels far above the ground water. The chemical concentration data from soil and soil gas samples of Boring 8-211 demonstrate that TCE concentrations decline rapidly with depth below the 50-70 ft interval in Area 8. These data also indicate that the TCE concentrations are extremely low -- the highest total soil concentration of TCE in boring 8-211 was 30 ug/kg at the 70-ft depth; and no TCE was detected in any of the other soil samples collected from this boring. These results compare favorably to the Arizona Department of Health Services ("ADHS") guidance cleanup level of 320 ug/kg for TCE in soil.

The soil gas data from vapor monitoring well 8-211 indicate that the only soils in the boring that may have exceeded the ADHS guidance cleanup level are those found in the 45-55 ft depth interval. Using the soil properties given in Table K-3 of the RI/FS, equilibrium partitioning of TCE between the gaseous, adsorbed and aqueous phases demonstrates that the soil gas concentration corresponding to the ADHS guidance cleanup level for TCE in soil (320 ug/kg) is 460 ug/L. The highest soil gas concentration measured was 727 ug/L (at the 45-55 ft depth interval), and the concentrations dropped off rapidly with depth. The soil gas concentration nearest the underlying ground water, in the 170-200 ft depth interval, was found to be only 23 ug/L, or 20-times lower than the ADHS guidance cleanup level.

In addition, thick layers of silt and clay separate the upper soils from the underlying ground water. When these thick layers and the leachate dilution during ground water mixing are properly accounted for, the low levels of TCE detected in the soils in Area 8 do not represent a significant threat to underlying ground water. As a result, the final RI/FS should not include a recommendation for vadose-zone remediation of Area 8.

* * *

The Public Comment Draft did not acknowledge the technical points made in Parts IV.A. and B. above. These points are critical to a complete technical evaluation of the vadose zone and must be incorporated in the final RI/FS.

RESPONSE:

The comparison of deep soil and soil gas data is not appropriate because the ADHS-suggested cleanup levels are based on direct human exposure to the contamination. The evaluation performed by EPA is focused on Area 8 as a potential continuing source of ground-water contamination. Siemens comment does not provide a technical basis for a conclusion that Area 8 is not a continuing source of VOCs to ground water. EPA acknowledges that, at the levels found, VOCs in the vadose zone at Area 8 generally do not appear to present known health threats due to direct contact.

V. THE PROPOSED SELECTION OF ALTERNATIVE 2 FOR THE UAU IS FULLY SUPPORTED BY THE RECORD

The documents accompanying the Public Comment Draft indicate that EPA intends to select Alternative 2 for remediation of the UAU. Alternative 2 combines extensive vadose zone source identification and control activities with UAU monitoring while the UAU is remediated by the Operable Unit I ground water extraction and treatment system. As a part of Alternative 2, TCE concentrations now in the UAU will enter the middle alluvial unit (MAU) and the lower alluvial unit (LAU) where the Scottsdale Operable Unit remedial action will capture and treat the contamination. Based on the substantial extraction of TCE-contaminated UAU ground water that will occur as a result of Operable Unit I, the Public Comment Draft correctly notes that Alternative 2 is not a "No Action" alternative. See Public Comment Draft at 10-9.

Siemens agrees with EPA's selection of Alternative 2, which takes advantage of the extensive system currently being implemented as a part of OUI. Alternative 2 will be fully protective of human health and the environment and will be significantly more cost effective than other alternatives reviewed by the Agency.

RESPONSE:

EPA is selecting monitoring of the UAU over UAU extraction alternatives at this time. However, if the mass of VOCs in the UAU does not decrease continuously and significantly, or if UAU contamination spreads to previously uncontaminated areas in the UAU, MAU, or LAU, EPA will reassess the appropriateness of ground-water extraction from the UAU.

COMMENTS FROM SMITHKLINE BEECHAM

Enclosed with this letter are SmithKline Beecham ("SB") Corporation's comments on the Public Comment Draft of the North Indian Bend Wash Remedial Investigation/ Feasibility Study ("NIBW RI/FS") and EPA's proposed plan for remediation of the Upper Alluvial Aquifer Unit (the "UAU") and NIBW soils.[6] The comments were prepared by The MARK Group, SB's technical consultants at the site. We include a few additional observations in this letter.

The Mark Group addresses two basic issues. EPA's analysis and remedial alternatives for soils, and EPA's analysis and options for the UAU. The discussion of soil primarily focuses on Area 3, the southern portion of which was occupied by Beckman Instruments, Inc., and EPA's use of the VLEACH Model. Because SB generally supports EPA's proposal of a "no extraction, continued monitoring" approach for the UAU, the comments on groundwater primarily address the extraction alternatives, although a few observations about treatment and end use are made.

SB generally agrees with the advisability of further investigation of soils at NIBW (although we have substantial concerns about the use of the VLEACH model as the basis for determining whether additional investigation is necessary). If a significant source of trichloroethylene ("TCE")[7] were discovered in soil, further investigation would be warranted to determine if it could migrate to groundwater and, if so, whether its extraction from the soil would be more efficient than treatment of the affected groundwater.

In the case of Area 3, however, we believe that the Public Comment Draft contains a critical mistake. Specifically, it states that disposal of VOCs by Beckman is alleged to have occurred in the northwestern portion of Area 3. (Vol. 1, p. 1-21.) This is incorrect. Disposal of VOCs by Beckman is alleged to have occurred in the northwestern portion of Beckman's former facility, i.e., in the northwestern portion of the southern half of Area 3. Investigations by The MARK Group, including shallow soil gas survey, installation of a soil vapor monitor well and analyses of soil samples from borings, demonstrate the absence of significant quantities of TCE, perchloroethylene, 1,1,1-trichloroethane and chloroform in the area of alleged disposal.

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[6] In this letter we use the term "Public Comment Draft" to refer to the current draft of the NIBW RI/FS and the term "Technical Committee Draft" to refer to the earlier draft of the RI/FS issued by EPA for IBW Technical Committee Review.

[7] A number of volatile organic compounds ("VOCs") have been identified in soil and groundwater at NIBW. Of these, however, TCE appears to be the most widespread and in the greatest concentration. Accordingly, we use TCE throughout the comments to refer to VOCs in general unless specifically noted otherwise.

RESPONSE:

EPA believes Table 1 in the ROD accurately summarizes information related to potential sources at NIBW. Please see the Record of Decision for the approximate locations where EPA has selected further investigation.

To the extent the error in the alleged location of disposal drives EPA's recommendation that two soil vapor monitor wells be installed in Area 3, EPA should reconsider its proposal in light of the correct location of and the essentially negative analytical results in the area of alleged disposal. SB confirms its comment on the Technical Committee Draft that **any additional soil vapor study in Area 3 need only be carried out in the northern portion of Area 3**, i.e., in the vicinity of Plainville West/Marro Plating, where the highest concentrations of TCE in Area 3 were found in soil gas and soil samples from boring 3-213. (See also Chapter 3 of The MARK Group comments.)

RESPONSE:

The approximate locations for the additional soil vapor monitoring wells required by the ROD for Area 3 are indicated on Figure 14 in the ROD. It is possible that the contamination emanates from facilities other than Beckman's. However, present data cannot verify this hypothesis.

It is also important to emphasize that The MARK Group identifies serious deficiencies with the VLEACH model, which EPA uses to determine whether TCE detected in soils poses a risk of migration to groundwater. Accordingly, SB recommends that EPA develop a more reliable method than the use of VLEACH to make this determination. (See also Chapter 4 of The MARK Group comments.)

RESPONSE:

The MARK Group's comments on VLEACH are typical of the sort engineers and scientists often make on the valid works by others. We disagree that "serious deficiencies" were identified for VLEACH. We acknowledge that improved methods could be developed for any scientific calculation. As at other sites, PRP consultants are encouraged to write new and more comprehensive model codes. As it stands, VLEACH is appropriate for present uses at NIBW.

SB continues to believe that the "no extraction, continued monitoring" approach to the UAU is the best of the alternatives evaluated by EPA. We note that among the differences between the Technical Committee Draft and the Public Comment Draft is the addition of Extraction Alternative 5, which consists of ground water extraction in the

vicinity of Miller and McDowell Roads. The major concerns raised in our comments to the Technical Committee Draft remain. Even if any of the extraction alternatives were implemented, a large portion of TCE in the UAU would migrate to the Middle Alluvial Aquifer Unit (the "MAU") over time. (See discussion in Vol. 1, p. 7-15). The Arizona Department of Water Resource's Groundwater Flow and Contaminant Transport Modeling of North Indian Bend Wash (Vol. 5, Appendix L) concludes that none of the proposed extraction alternatives would be more than 25 percent effective in reducing TCE in the UAU compared to the no extraction approach. In other words, under any of the extraction alternatives, recovery of TCE from the UAU will decrease exponentially over time with approximately 75 percent ultimately migrating to the MAU. Additionally, there are real questions regarding dewatering of the UAU and sustaining yield from extraction wells. In summary, extraction from the UAU would be both impractical and economically inefficient.

Adoption of a "no extraction" alternative also avoids the thorny issues associated with the end use of water. As recent negotiations of the Scottsdale Operable Unit ("O.U.") Consent Decree underscore, water end-use issues in Arizona are both exceedingly complex and volatile. Furthermore recharge entails a risk of forcing TCE-affected UAU groundwater into currently unaffected areas.

RESPONSE:

EPA has selected a remedy which does not include pumping from the UAU at this time. Based on continued monitoring required by the ROD, EPA will evaluate the need for further remedial action.

The MARK Group also questions the need to expand the UAU monitoring network to the degree considered by EPA. Accordingly, SB supports EPA's choice of Ground-Water Remedial Action Alternative 2, with the qualification that the number and location of additional wells, if any, necessary to monitor the UAU should be subject to IBW Technical Committee review. (See also Chapters 3 and 7 of the MARK Group comments.)

RESPONSE:

The density is based on inspection of the variability of the data from the existing network. This density is not arbitrary and may provide only the minimally acceptable capacity to observe movement within and from the UAU in critical areas. Protectiveness is the primary concern here. As the required density stands, over 1,200 feet is unmonitored between wells, and this sparcity may lead to the need for additional wells. The actual locations of monitoring wells will be discussed with the NIBW Technical Committee as have all EPA-suggested installation programs. EPA maintains authority for selection of number and location of wells.

Finally, in the discussion of potential Applicable or Relevant and Appropriate Requirements ("ARARs") and other criteria to be considered ("TBCs"), EPA explains that actual ARARs will be identified in the Record of Decision (the "ROD") and that many unidentified and nonpromulgated state advisories could be pertinent (i.e., could be TBCs). SB is particularly concerned that EPA has not fully evaluated and identified ARARs and TBCs in the Public Comment Draft. The National Contingency Plan requires EPA to provide the public with a reasonable opportunity to comment on "the proposed plan and the supporting analysis and information...." 40 C.F.R. §300.430(f)(3)(C) (emphasis added). If ARARs and TBCs that are not identified in the Public Comment Draft become part of EPA's supporting analysis and information in selecting a remedy, the public will have been deprived of an opportunity to comment. EPA should publish all ARARs and TBCs prior to issuance of the ROD and provide a reasonable period for the public to comment upon them. Accordingly, SB reserves its right to comment on ARARs and TBCs when they are published.

RESPONSE:

Public comment on the NIBW RI/FS and Proposed Plan, including ARARs, was provided for in accordance with CERCLA and the NCP. The final ARARs and other criteria for the selected NIBW remedial actions are identified in Appendix A of the ROD. ARARs and other criteria that were not in the RI/FS but that are identified in the ROD are discussed in Section II.K of the ROD. These ARARs and other criteria did not substantially impact the remedy selection. Nor do we believe that they require further public comment.

COMMENTS FROM WILLIAM C. VAN NORMAN, JR.

1. Soil Testing

At the public comment meeting on May 8, 1991, we were told that soil gas testing was yielding better results than soil matrix testing. Below are some of the figures I found in my research of the RI/FS in Area 5 and Area 12 regarding comparison of these two methods.

Area 5	Soil Gas	Soil Matrix
TCE	8.5 mcg/l	<10 mcg/l
PCE	4 mcg/l	<10 mcg/l
Area 12	**Soil Gas**	**Soil Matrix**
TCE	500 mcg/l	Readings as high as
PCE	4900 mcg/l	200,000 mcg/l for all
DCA	1600 mcg/l	4 substances
TCA	65 mcg/l	

The EPA has stated that only soil gas testing will be done in the future. I feel that published results of previous testing shows [sic] both methods have merit; to verify complete cleanup, I feel both types of testing should continue to be used.

RESPONSE:

Soil matrix readings are in µg/kg, not µg/l. The relationship relating µg/kg to µg/l has a major impact on the points made by Mr. Van Norman. The 200,000 µg/kg reading was incorrectly reported and has been corrected to 200 µg/kg. Based on available information for NIBW, EPA feels soil gas sampling is a better method to determine total contaminant mass in the vadose zone and therefore its impact on ground water through use of the VLEACH model.

2. "More Study Needed"

Listed below are some of the figures I found in my research of the RI/FS regarding Areas 5B and 12.

Area 5B: In 1983, SRP detected TCA at 54 mcg/l in surface water runoff in the Granite Reef Wash during a thunderstorm. In 1988, further testing showed readings of methylene chloride at 600-1200 mcg/kg; chloroform at 400-

600 mcg/kg; carbon tetrychloride [sic] at 100 mcg/kg; and bromomethane at 800 mcg/kg, as reported in the RI/FS.

Area 12: As reported in the RI/FS, TCE has been detected at 76 mcg/l, and TCA at 62 mcg/l.

In Area 7, which has been designated for cleanup, the highest reading of TCE, using the soil gas method, was 41 mcg/l. The readings of Areas 5B and 12, as listed above, are clearly higher and of more concern than those of Area 7; why then are these areas not designated for cleanup, but rather designated as "more study needed"? I feel the term "more study needed" has been used as a method of foot-dragging by the EPA. The contamination was first detected in 1983--eight years ago--at this stage, something should be happening regarding the cleanup of this contamination.

RESPONSE:

Although the soil gas reading is correct as noted by Mr. Van Norman, a soil vapor monitoring well (Boring 7-209) recorded TCE levels much higher (821 to 6,770 µg/l). These data indicated vertical contamination throughout the vadose zone. In Areas 5B and 12, the EA indicates the soil contamination does not present a direct potential health risk. However, since the levels noted are a concern to the EPA, a soil vapor monitoring well is planned in Area 5, and five soil vapor monitoring wells are planned for Area 12. If additional data indicate an area selected for further study presents an unacceptable threat to underlying ground water, the ROD requires SVE for each such area.

3. Treatment Methods and Health Risks

Oxidation and bioreclamation have been written off as "unproven technology," even though they are acknowledged as being used in a few locations in the RI/FS. I would suggest that these methods be mixed in with the SVE method to advance the cleanup operation. Methods of "unproven technology" have to be proven somehow, and if they could be useful in this operation, I feel they should be incorporated.

RESPONSE:

EPA believes the SVE method is the best available technology for vadose zone remedial action under conditions identified at NIBW. EPA has considered other technologies, including several that are unproven. While the comment is valid regarding the need to prove new technologies, for NIBW, the potential risks of trying an unproven technology are not warranted given the existence of SVE, which has been proven elsewhere as extremely effective at reasonable cost.

I believe the health risk from soil gas exposure has not been adequately addressed. The RI/FS states the risk cannot be quantified due to lack of data. What kind of data is needed to quantify the risk? Many readings reported in RI/FS were taken from as shallow a depth as three feet. With reading as high as 10,000 mcg/kg TCE at 40 feet (Area 7), exposure to VOCs by construction workers, etc., could certainly occur.

RESPONSE:

As mentioned in the Endangerment Assessment (in the RI/FS) exposure to workers in trenches at source areas increases the cancer risk by $1x10^{-12}$ to 10^{-10}. Risk from soil gas is expected to be an insignificant risk to human health. Soil matrix VOC concentrations of 10,000 µg/kg 40 feet below land surface are not expected to present a human health threat from direct exposure.

I also feel the issue of on-site SVE exhaust contamination has not been adequately addressed. No figures have been given for the effectiveness of activated carbon treatment, nor for what the treated exhaust will contain. There is no mention of baseline air quality measurements being taken; without baseline readings, ongoing measurements would be difficult to interpret. Other exhaust treatments--thermal and catalytic incineration, chemical distillatoin [sic], and water scrubbers--have barely been discussed, and I feel there should be further comment on these treatment methods.

RESPONSE:

See page 6-8, paragraph 7, of the Public Comment Draft of the RI/FS. Activated carbon modules are required by the ROD to capture 90 percent of the VOCs contained in the exhaust. Additional monitoring of the SVE exhaust will prevent VOC breakthrough from occuring in the activated carbon system.

I cannot believe that in Area 8, consideration is being given to not using an activated carbon filtration system. Is the plan simply to pump raw contaminated soil gas into the air which we and our children breathe?

RESPONSE:

Activated carbon treatment is required by the ROD as part of the SVE system for Area 8 to reduce waste mobility and volume, and to comply with Maricopa County VOC air emission guidelines.

4. Water Treatment Plan

I am satisfied with the bulk of the water treatment plan, i.e., water stripping, but the same questions apply as to exhaust air, as mentioned above, regarding carbon filtration. I understand the EPA does not allow industry to use carbon filtration to treat VOC exhaust; why is its use good enough for a cleanup operation such as this?

RESPONSE:

EPA does allow use of carbon to treat VOCs in the vapor phase under CERCLA.

I think there should be a mechanism in place for re-evaluation of the "no action needed" decision concerning upper alluvial ground water. If the water shows no improvement or is shown not to be moving to the middle and lower levels, then it should not be treated, and the public should be informed and should be a part of the decision process.

RESPONSE:

Ground water will be reevaluated periodically with respect to contaminant transport into or out of the UAU. Ground-water extraction from the UAU or from additional locations in the MAU and LAU may in fact be necessary in the future.

I have mixed feelings about the proposals put forth, first I think it's a step in the right direction to begin the cleanup process, but the continued foot dragging by failure to take direct action on all soil sites and the upper alluvial water leaves me disappointed.

RESPONSE:

EPA acknowledges that the cleanup process sometimes seems cumbersome, but stresses it is actively pursuing progress at all areas that require remedial action. While we are attempting to move site cleanup forward as quickly as possible, we must balance expediting cleanup with the mandate to protect human health and the environment. Without extreme care in decision-making and implementation, potential remedies could make conditions worse rather than better.

I am also concerned about prior and continued health problems and risks to residents in the site area, specifically those in contaminated soil areas. Thank you for addressing these comments. Health facts supplied by COC and a meeting with them would be appropriate.

RESPONSE:

EPA and ATSDR met with the NIBW community on July 18, 1991, to discuss health concerns related to the site. ATSDR may hold additional meetings for NIBW in the future.

COMMENTS FROM BETTINA Z. VELGOS

On February 19, 1991, a ground-water monitoring well was installed adjacent to our house located at 7752 East 4th Street (N. 78th St. and 4th St. corner) in Scottsdale.

Structural damage to the house consisting of cracks in the exterior block house wall directly in-line with the monitoring well site, interior stucco cracks and an Arcadia door in the living room that became almost impossible to open and close resulted on February 22, 1991 due to the well drilling.

We contacted James R. Nelson, Water Quality/Conservation Manager of the City of Scottsdale who inspected the damages and referred us to Greg Zekoff of Lane Environmental Services. On March 29, 1991, Lane Environmental sent Scott Duck to our house to take photos and do an estimate of the damages. On April 20, 1991, Mr. Duck removed the Arcadia door to inspect and clean the wheels, but the door still did not move freely in certain areas. It was observed that the frame supporting the door was no longer square and that it appeared the house had settled as a result of the drilling which took place for 1 1/2 weeks starting on February 19, 1991.

Our concern is that the EPA-proposed Soil Vapor Extraction (SVE) alternative would involve further drilling at or near the site next to our house and that structural damage has already occurred. What will happen to our house in the two years needed to complete SVE?

We urge that EPA reconsider the drilling site and not locate it at the same site as the monitoring well in Area 7 due to the proximity of our house to the well. A thorough study of the neighborhood would suggest an area to the north of the existing monitoring well as there is a vacant lot and a house with a large offset.

A letter from Levine-Fricke dated February 7, 1991 to the area homeowners stated that the ground-water monitoring well would result in "only a temporary minimal amount of inconvenience". Obviously, structural damage to a house is more than an inconvenience, and not temporary.

We demand that the existing structural damage and any subsequent damage to our house be remedied. Since the house has settled and may continue to settle, a sliding door replacement would not be feasible.

An alternative would be to replace the existing door with a door which swings out and is not on a track, such as a double French door. We do not feel it is our responsibility to pay for the damages and insist reimbursement from proper parties involved.

RESPONSE:

Please see Figure 12 of the ROD for the approximate locations of required drilling in Area 7. None of the locations appear to be on the property discussed in the comments. The drilling referred to in the comment was neither performed by, nor required by, EPA. Your efforts to contact those who actually performed the work appear to be the correct course of action.